

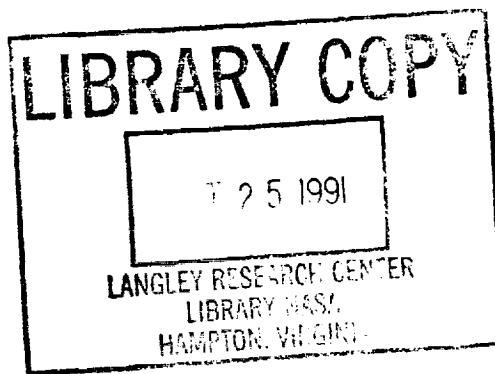
LONG DURATION EXPOSURE FACILITY

MATERIALS SPECIAL INVESTIGATION GROUP

LDEF SUPPORTING DATA

P.198

PRELIMINARY REPORT ON LDEF-RELATED CONTAMINANTS

LDEF
MSIG

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CONTAMINANTS**

FOREWORD

The National Aeronautics and Space Administration Long Duration Exposure Facility (LDEF) was launched into low-Earth orbit (LEO) from the payload bay of the Space Shuttle Orbiter Challenger in April 1984. It was retrieved from orbit by the Columbia in January 1990. The 57 LDEF experiments covered the disciplines of materials, coatings, and thermal systems; power and propulsion; space science; and electronics and optics. LDEF was designed to provide a large number of economical opportunities for science and technology experiments that require modest electrical power and data processing while in space and which benefit from post-flight laboratory investigations of the retrieved experiment hardware on Earth. Most of the the materials experiments were completely passive; their data must be obtained in post-flight laboratory tests and analyses.

The 5 year, 10 month flight of LDEF greatly enhanced the potential value of most LDEF materials, compared to that of the original 1-year flight plan. NASA recognized this potential by forming the LDEF Space Environmental Effects on Materials Special Investigation Group (MSIG) in early 1989. MSIG was chartered to investigate the effects of the long LEO exposure on structure and experiment materials which were not originally planned to be test specimens, and to integrate the results of this investigation with data generated by the Principal Investigators of the LDEF experiments into the LDEF Materials Data Base.

Initial post-recovery examinations of LDEF indicated extensive contamination in some areas and light contamination in most areas of LDEF structure and experiment trays. An understanding of the specific morphology and chemistry of this contamination will be required to completely understand the performance of most LDEF materials and systems. Accordingly, MSIG decided to define the contamination generated by LDEF and deposited on its surfaces during its exposure in LEO. Molecular and particulate contamination deposited on LDEF surfaces during the pre- and post-flight, launch, recovery and deintegration phases of its mission were included in the MSIG Contamination Task. Thus, the contamination studies of MSIG will supply the LDEF Contamination Supporting Data to the LDEF Investigators for the detailed analyses of their experiments.

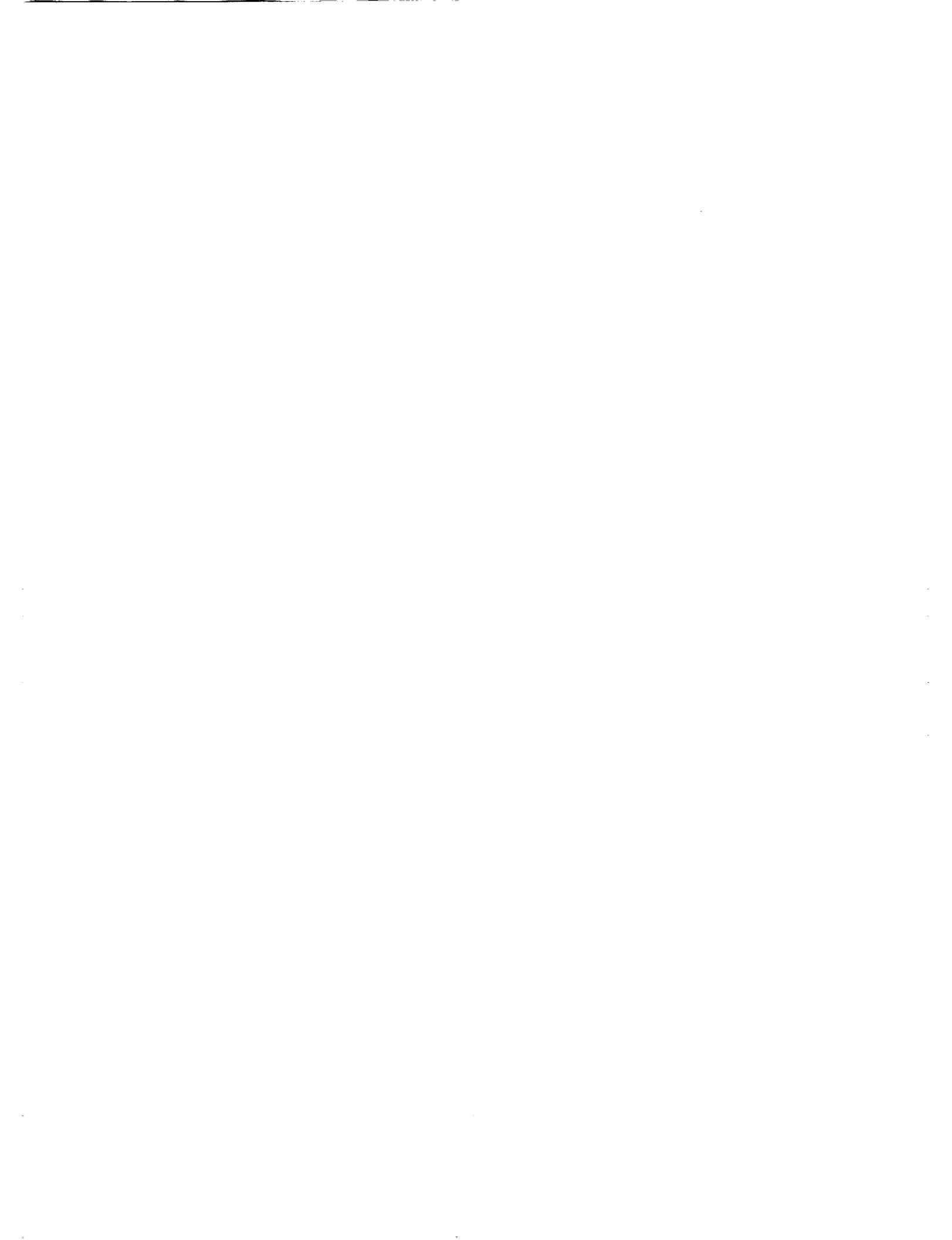


This document is the preliminary report on LDEF contamination, prepared by Boeing Aerospace and Electronics under NASA Contract NAS1-18224, Task 12 "LDEF Materials Data Analysis". It is the intention of the LDEF Materials Special Investigation Group to continue the contamination analyses and to publish subsequent reports on further contamination studies and suggested contamination mechanisms.

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PRELIMINARY REPORT ON LDEF RELATED CONTAMINANTS
AUGUST 1990



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SUMMARY

The preliminary investigation of contaminants present on LDEF has indicated that sources of both silicones and hydrocarbons were responsible for the accumulated molecular films. The deposited molecular films are the product of multiple sources and of molecular modification induced by the intense ultraviolet radiation of the orbital environment. The deposits tend to consist of the same basic functional groups characteristic of such deposits found on other spacecraft with the exception of the organo-phosphate seen in the films on tray C-12. These functional groups include carbon-hydrogen carbonyl, amine, amide, hydroxyl, methyl silicones, and siloxy groups. The organo-phosphates of tray C-12 have been traced to the outgassing of the fire retardant used for the fiber optics in that tray.

Much of the deposited film on LDEF is on surfaces oriented spaceward. Samples of the film on tray C-12 has been found to consist of over thirty-three distinct layers. This layered structure has also been observed in the films from the space and earth ends of LDEF.

The layered structure indicates that the majority of the molecular deposition was not line of sight and that the film was fixed by a cyclic process or exposure. The estimated total weight of the molecular films on LDEF is one pound.

The particulate contaminants are varied and exceed a MIL STD 1246B level 1000. Particle sources include a variety of manufacturing environments, natural airborne contaminants, shuttle bay contaminants, and particles typical of clean room processing. It has been possible to distinguish between particles present on the surface during orbit, those relocated during re-entry and the ferry flight, and new particles introduced since orbit. It has been determined that the particulate cleanliness of LDEF at launch exceeded a level 1000.

Both shuttle and KSC operations have been identified as a source of particulate contaminates though the quantitative contribution of each has not been determined at this time.

INTRODUCTION

The purpose of this report is to provide information on the amount and types of contaminants present on the surface of LDEF experiments as an aid to the principle investigators. Later reports will include more information

on contaminant sources and mechanisms of contamination. This report may serve to provide information on the effectiveness of current monitoring methods and the cleanliness of facilities or operations related to the exposure of LDEF.

METHODS

The reliability of the analytical results are strongly dependent upon the instruments and procedures being used. The following discussion addresses those methods that have currently been applied and upon which the preliminary results are based.

Molecular Contaminants

The distribution of molecular contaminants on the surface of LDEF was documented photographically. Selected photographed areas were then analyzed for thickness using the visible interference fringes or the relative intensity of the brown film color as indicators of thickness. The derived thickness value was then used to calculate the amount of film on the surface. This value is expected to provide a rough order of magnitude value for the volume and mass of condensed material on the exterior of LDEF.

The molecularly deposited film flaking from areas of the space and earth directed ends of LDEF (here after referred to as 'free films') were tested using infrared spectroscopy, X-ray fluorescence, molecular refraction, ashing, pyrolysis separation, solvent separation, and ultra-microchemical techniques. These tests were applied directly to the film or, in the case of infrared analysis, also to potassium bromide pellets of the film and to diffuse reflectance from the film ground with potassium bromide. The resultant characterization of the film was used to facilitate the detection of differences in the film from other areas due to local, unique sources or environmental effects such as atomic oxygen and ultraviolet radiation, or thermal cycling.

The infrared analyses were performed using a Digilab model FTS 60 and a Perkin-Elmer model 1700 series with a 7000 series computer and a Spectro-tech microscope system. The free films were ground with potassium bromide (KBr) and then analyzed in the diffuse reflectance mode using the high numerical aperture Cassgrain optic of the Spectra-tech microscope or pressed into a pellet for transmission spectra. The free film was also analyzed directly using the diffuse reflectance mode to characterize the spectra of the top layer of the film compared to the bottom layer. Films from other surfaces were often analyzed in place using diffuse reflectance and compared to the diffuse reflectance spectra of the free films. When specular effects interfered with the spectra the surface was rubbed

with powdered KBr or with fine silicon carbide sandpaper to collect a diffuse sample. These samples were then analyzed using diffuse reflectance or, in the case of the sample collected on KBr could be pressed into a pellet for transmission spectra analysis. The silicon carbide procedure also worked well for removing thin films of molecular deposits over organic substrates. The KBr powder rub worked well for collecting thin deposits spread over relatively large areas (multiple square inches). The infrared spectra generated using these techniques identified the major absorption bands (corresponding to key functional groups) present. Films from some curved surfaces showed properties changes from environmental exposure. Changes in the ratios of the principle absorption bands present and the appearance and growth of new absorption bands as a function of exposure to ultra-violet radiation or the combination of ultra-violet radiation and atomic oxygen were documented. The small analytical field size of the spectra-Tech FTIR microscope facilitated this type of analysis.

Microprobe X-ray fluorescence analysis was performed on a Cambridge scanning electron microscope (SEM). The space end free film, ashed space and free film, scraped film from C-12, ashed scraped film from C-12, and film deposited on clamps were analyzed using this technique to characterize the elements present. The free or scraped films and ashed films had to be carbon coated to prevent charging and loss of sample during analysis. Elemental mapping was also used to characterize the distribution of the deposits on clamps.

Molecular refraction analysis was performed using Cargille standard refractive index liquids and a series of specific gravity liquids prepared from chlorobenzene and bromoform. The film was first tested in these solvents and found to exhibit no swelling or tendency to dissolve in these solvents. The film was isotropic so the application of the Lorentz-Lorentz equation was simplified to the following form:

$$r_D = ((n-1)/(n+2)) (1/p)$$

Where

r_D = the specific refraction of the material

n = the refractive index of the material

p = the density of the material

The specific refraction of a substance indicates the density of outer shell electrons per unit volume and the nature of the bonding between atoms or ions. When the molecular weight of the material is known the molecular

refraction can be determined as the product of the specific refraction and the molecular weight. The molecular refraction can then be used to determine the molecular structure using clues from the IR spectra and the atomic refractions from physical tables. This technique is valid only for the determination of the structure of a pure substance, but lacing a pure substance it will provide some data on the possible contribution of different functional groups in the composite material. It is in the latter fashion that the specific refraction approach was used in this instance.

The ultra-micro-chemical technique used was based on the method of Koerbl. This method uses an ignition with silver manganite to create the oxides of the elements present followed by very sensitive tests for the oxides. This test was used to confirm the presence or absence of specific elements in the bulk film.

Ashing followed by X-ray fluorescence was used to identify the refractory elements. Films from C-12 and from the space end were ashed in a muffle furnace at a temperature of 600°C for eight hours. The ash was then mounted on an SEM stub for analysis.

Pyrolysis in a closed capillary tube was used to try and separate the film into distinct phases but this proved unsuccessful in separating distinct phases from the film.

Particulate Contaminant

Particulate contaminants were analyzed using automated image analysis, light microscopy, electron microscopy, X-ray fluorescence, FTIR, and microchemical techniques. These analyses were performed directly on LDEF surfaces and on particles collected using tapelifts or direct transfer to a glass slide for light microscopy or microchemical test, a KBr window for FTIR, or an aluminum stub for electron microscopy.

The history of many of the particles was determined based on associated materials of particle color, texture, or morphology. The light microscope and both an Olympus Cue-2 and a Leitz TAS image analyzer were used to generate particle counts. Total obscuration values will be determined directly using image analyzers and reported in a future report.

The other techniques helped characterize the surface deposition effects of the debris present or created in the orbital environment of LDEF.

Facility Monitoring

Particles and volatile condensable materials (VCM) in the shuttle bay were monitored using the IOCM unit. The results, though not yet complete, were interpreted by individuals under contract. The airborne particle count, VCM, temperature, and relative humidity for the orbiter processing facility (OPF) and the cannister were monitored by Lockheed and NASA personnel. The particle fallout rate, the airborne particle count, VMC, airborne hydrocarbon, temperature, and relative humidity for SAEF-2 was monitored by McDonald Douglas. Tapelifts of surfaces were used to provide a sample of particles in specific areas that could provide quantitative and qualitative data as required. Tapelifts were used to document the condition of surfaces or changes in surface contaminant concentrations or composition from one sampling to another. Boeing was responsible for the analysis of the tapelifts. Rate values were not calculated because the surfaces involved were not passive. Particle counts and analyses were carried out for tapelifts taken directly on LDEF surfaces. Using these tapelift's particles present during orbit, those moved or added during recovery and transport to Kennedy Space Center (KSC), and those added after arriving at KSC could be identified.

The airborne particle count was determined both by automatic particle counter and by volumetric samples filtered through membrane filters. In SAEF-2 only automatic particle counters were used. The automatic particle counters in SAEF-2 were permanently mounted at a height of about ten feet above the flow and along the walls or on columns at the edge of the high bay.

The particle fallout rate was monitored using three membrane filters of approximately one and a half inches (1.5 sq. in. or 1000 sq. mm) each. Each set of three filters was exposed for approximately two weeks. The particles larger than fifty (50) micrometers were then counted in bins of 50 to 100, 100 to 250, 250 to 500, 500 to 750, 750 to 1000, and over 1000. The actual counts were multiplied by 96 to convert the count to a square foot basis and then divided by the number of days the sample was exposed. A cumulative count of the number of particles greater than the designated size settling out of the air per 24 hours was then reported. A separate set of four filters were placed on the LATS to monitor the fallout at the edge of LDEF. The particle count values were calculated as above.

Temperature and relative humidity were monitored continuously once LDEF arrived at KSC.

RESULTS

The study of the LDEF photographs indicated that the deposition of the molecular film was largely not line of sight for the exterior surfaces. Photographs indicate the even coverage of the trailing side framework structure that viewed open space. Photographs also document the discoloration of the teflon grapple fixture that not only viewed space but was positioned about two feet outboard from the LDEF surfaces. This discoloration was also evident on the tray clamps that were not exposed to atomic oxygen. The thickness of this material was generally greater than one micrometer as determined by the lack of interference colors, though a distinct brown was evident. The thickness was generally less than five micrometers based on the failure to cover glass fibers of that diameter found on the same surface. There were numerous areas where the film was as thick as one hundred micrometers but the percentage of surface area covered by such thick films was less than one percent of the total. There were also areas with film thickness less than 0.1 micrometer. For the purpose of a first order estimate of film volume and mass a thickness of three micrometers and a density one gram per cubic centimeter was used. The projected surface area of LDEF is approximately 1,512,000 square centimeters. Using a thickness of 0.0003 centimeters the calculated volume of the film on LDEF is 454 cubic centimeters, or about one pound using a density of one gram per cubic centimeter. If the total condensable material represented 0.1 percent of the mass of the source the source weight would have to (must) be greater than 1000 pounds. There have been a number of discrepancies in the reported masses of possible source materials. All of the discrepancies have been reporting significantly less material than is in fact found on the flight hardware; RTV silicones are found to be widespread and were used in generous amounts not even suggested in the original inventory. There have also been discrepancies in the formulations reported, notably in the amount of silicones present in Z-306. The actual amount of volatile-condensable material (VCM) on LDEF has not been determined. Mass balance calculations will be used as the analysis continues to help narrow the possible sources of the film and to estimate the molecular flux return rate. A key part of identifying the source is a chemical characterization of the film. Many additional tests are in progress and will be included in later reports.

Molecular Film Composition

The presence of a brown film over much of the surface of LDEF was first indicated by the astronauts recovering the satellite. The first collection of LDEF debris in the shuttle bay included flakes of this brown film. On closer examination of LDEF surfaces this brown film could be seen flaking from surfaces on both the earth and space ends as well as from the corners of

some trays. Chart #1 and #2 of appendix 1 are the infrared spectra of the films from the earth end and space end, respectively. The spectra are essentially identical. The significance of the specific absorption bands is not clear from the spectra alone but has become more clear with the accumulation of additional data.

The bulk elemental composition of the flaking film includes hydrogen, carbon, oxygen, nitrogen and silicon as determined using ultra-microchemical tests and microprobe analysis (see appendix 1 charts #3 and #4).

The film is optically homogeneous both before ashing and after ashing. This indicates that the film is a single phase, a solution of different phases or that the phases have the same refractive index. Because of the relatively high refractive index of the film, 1.58, the silicon could not be present as particles of silicon dioxide without clouding the film. The elemental composition of this ashed film is silicon and oxygen and it exhibits refractive indices below 1.49 which is characteristic of amorphous silicon dioxide. The refractive index of the film prior to ashing is beyond the range of simple silicone materials, indicating an important hydrocarbon component.

The density of the free film is about 1.68 grams per cubic centimeter as determined by the sink-float method in solutions of bromoform and monobromobenzene. The specific refraction of the film is 0.198. This is lower than most hydrocarbons but if this was a silicone film with this specific refraction the refractive index would have to be around 1.44. This analysis would suggest a mixture of silicones and hydrocarbons with the mass percentage favoring the silicone fraction.

The composition of the film exhibits the effects of both local sources and the type of environmental exposure. The deposit in the area of tray C-12 is a good example. Tray C-12 was experiment SO109. This experiment included sets of optic fiber bundles that were coated with a fire retardant material. This fire retardant (reportedly tri-octyl phosphate) was not stable in vacuum and as a result outgassed an hydroscopic organic phosphoric acid and condensed onto adjacent surfaces and codeposited with other outgassing species on the outward facing front surface of the tray. On the exposed surface ultraviolet radiation polymerized the deposit into a stable solid film. In the absence of this polymerization the film remained hydroscopic. With re-entry into the lower atmosphere the hydroscopic material began absorbing water. During the ferry flight to KSC LDEF experienced intervals of one hundred percent relative humidity and at KSC experienced humidities about seventy percent prior to entry into the SAEF-2 facility (see facilities section below). The hydroscopic part of this deposit

was discovered in SAEF-2 when a liquid began draining from the tray as LDEF was rotated for the first time following re-entry. The infrared spectra for both deposits are shown in appendix 1 as chart #5 and #6. Chart #7 of appendix 1 shows a reference spectra for the suspected fire retardant. When the solid, polymerized film from this tray was ashed phosphorus was a major element present (appendix 1 chart #8).

Chart #9 of appendix 1 indicates some of the absorption bands associated with specific functional groups. Chart #10 of appendix 1 is the spectra of an adhesive used on experiment A0178 to fix velcro strips to the Ag-teflon blanket. This is a silicone based adhesive and shows the typical silicone doublet between 1000 and 1100 wave numbers and the methyl-silicon stretch at about 805.

Spectra from other locations on LDEF are included for examination. A more complete explanation samples with respect to sources and environmental exposure will be provided in later reports.

Particulate Contaminant Size Distribution

The surfaces of LDEF are covered with a wide variety of particulate contaminants ranging in size from sub-micrometer micrometeorite impact created debris to centimeter sized pieces of material from experiments eroded by atomic oxygen. Actual particle counts made directly on LDEF surfaces indicate a MIL STD 1246B level 1000 was exceeded for all surfaces (see appendix 2 graph and lines 55 through 62 of the first table). Tapelift samples directly from LDEF surfaces also exceeded a MIL STD 1246B level 1000. Appendix 2, line 39, 45, and 46 are examples of such tapelifts.

The current condition of particulate cleanliness is not much worse than that when LDEF was launched. The cleanliness at launch and in orbit could be determined by the condition of the surface under the particle or by the exposed protected surface where particles had been displaced by re-entry or ferry flight forces. On the leading edge particles protected the surfaces from atomic oxygen exposure leaving silhouetted areas much less effected than the adjoining areas. On the trailing edge particles protected the surface from the brown film. When the particle was removed, a "clean" silhouette remained. Some of these surfaces were counted with the particles being placed in bins by size and by their history at that location. Line 57 of appendix 1 is an example of this type of analysis. The 'particles fixed since orbit insertion' are those particles that have stayed in place since LDEF was placed into orbit. They are typified by the silhouetting of the LDEF surface evident at their base. The 'relocated or add particles' are those with no such silhouetting. The final category, 'particle prints without particles' are the silhouettes on the surface that are the result of being

protected by a particle though the particle is no longer present. The cleanliness level 'on orbit' is the sum of the particulates in the first and last categories. The current cleanliness level is the sum of the particles in the first two categories. Appendix 2, line entries 57, 61, and 62 have 'On Orbit' entries that correspond to the particle count for the surface while in orbit. All three values are remarkably similar and indicate the particle distribution below:

PARTICLES > INDICATED SIZE IN MICRON/CU.FT.

	>25	>50	>100	>250	>500	>750	>1000
ON ORBIT	100,303	28,800	8,441	3,972	2,483	993	497

The last three entries are of limited statistical significance due to the small number of particles actually counted in those bins (1, 2, and 5). Discounting the last three entries and considering only the particles greater than two hundred and fifty micrometers the count still exceeds a level 1000. Based on the types of particles present the pre-flight cleanliness of LDEF exceeded a level 1000. Additional particles were added during integration with the shuttle or launch that are characteristic of the shuttle bay.

Particle Analysis

The light microscope has proven to be the most useful analytical tool for the identification and characterization of the particles on LDEF. Most of the results below are based on analyses performed using that instrument an optical crystallography, morphological analysis, microchemical analysis under the microscope, and related techniques. Some EDX and micro-FTIR have also been used.

Contamination control was not a critical issue for LDEF prior to launch. As a result manufacturing and assembly and handling residues are common. Natural airborne dusts also accumulated on LDEF surfaces. Most of the trays also exhibited the results of an attempt to remove the larger particles by solvent wiping of the surface. This cleaning left a significant molecular burden and did not clean the surface to a MIL STD 1246B level 1000.

Because of the variety of particulate contaminants on the surface, it will be easier to present them by generic source. Manufacturing debris is one of the major contaminant types. This category includes the debris generated prior to assembly of system. It also includes this type of debris than may be falling out on the hardware at later stages in the processing of the hardware. Magnitite (FeO to Fe₃O₄) spheres from welding, cutting, and grinding iron alloys was a common contaminant. These are shiny black spheres ranging from a few micrometers to over twenty-five micrometers.

They are magnetic and can be tested for this property in suspended in oil and examined using the microscope and a magnet. These spheres were found widely distributed over LDEF and were a common contaminant found in tapelift samples from a number of locations both on and off LDEF. Rust and metal scale were also found. Abrasive minerals were present but only emery (aluminum oxide) was at levels significantly above the potential natural background. Quartz is such a common natural mineral that it is not considered an industrial abrasive unless it is associated with organic binders. Quartz and emery are distinguished by the much higher refractive index of emery. Glass fiber, carbon fiber, and paint overspray are included with this type of contaminant. Most of these materials survived the atomic oxygen exposure on the leading edge and are often seen on pedestals of protected material when on organic substrates.

The assembly and handling residues include skin flakes, paint flakes, wear metals, clothing fiber, paper fiber, starch grains, spittle marks, fingerprints, cleaning residues, sawdust, plastic and rubber wear debris, etc. Most of these materials are identified by their shape and texture though transmitted polarized light microscopy is used to confirm the identification. Micro-FTIR was also used to confirm some identifications. EDX is not very useful for these particles due to the lack of any consistent elemental signature.

The natural airborne fallout includes natural minerals, salt spray particles, pollens and spores, plant parts, and insect parts. These materials are identified using polarized light microscopy or by their distinctive morphology. This type of particulate matter is very useful for evaluating the effectiveness of clean room barriers to protect hardware. In the case of KSC operations a significant intrusion of natural contaminants was marked by the presence of pine pollen grains on LDEF experiment surfaces.

Two types of particles have been identified that are characteristic of shuttle operations. One of them is the shuttle tile fiber. These thin, often curved fibers of fused quartz have a refractive index of about 1.48. They are very distinctive and have been found to be present on experiment surfaces during orbit as well as added during recovery. The other material is the ceramic glass fiber used in the bay liner. This has also been found on LDEF surfaces.

All of these types of materials were present on the surface of LDEF at launch. In orbit many of these materials were modified in ways that may be useful for future consideration (examples will be provided in latter reports). The orbital environment also created a new collection of particle sources. Fragments of organic polymers generated in orbit were widely distributed by the time LDEF reached KSC. Low energy micrometeorite

impacts on alodined aluminum surfaces ejected fragments of the alodine coating into the LDEF environment. Impacts on other surfaces had similar effects so that paint flakes, teflon residues, metal particles, glass particles, from the size of nearly a millimeter to gas phase elements were created and to some extent redeposited on LDEF. Atomic oxygen exposure generated ash and free metal foils that were added to the particle population on LDEF. Painted surfaces with mineral pigments or fillers were left with a surface of free mineral particles. Impacts resulted in the distribution of these materials into the general LDEF environment. Glass fiber composites were reduced to free glass fibers. Silicones were oxidized to silica. Many particles and large fragments of experiments were seen to be released upon grappling LDEF in orbit.

The major redistribution of these materials occurred during the recovery of LDEF and its transport to KSC. Wind erosion of fragile surfaces is evident as well as the transport of readily identifiable particles from their source to other trays and around the shuttle bay. The half millimeter on a side squares of aluminum foil backed by modified kapton is a good example. This material is from experiment M0003 on section I of tray D-09. These squares have been found on a number of other trays scattered around LDEF.

A brief comment on the types of glass fiber present on LDEF surfaces is in order. There are at least five sources of distinctive glass fiber associated with LDEF. These are the shuttle tile, the bay liner, venting filters, HEPA filter fiber, and atomic oxygen freed glass fiber from LDEF experiments. These are not listed in order of their presence on LDEF. Their concentration varies widely from one surface to another.

Facilities

The relative humidity that LDEF was exposed to was irregular until it reached SAEF-2 (see appendix 3). In SAEF-2 the relative humidity was maintained below 55% with only a few brief outages. The particle counts as monitored by automatic particle counter stayed below 100,00 per cubic foot of air over 0.5 micrometers with only a few brief exceptions. The graphs illustrating these features are included in appendix 3.

CONCLUSIONS

The following conclusion can be made based on the data to date:

1. Silicones are a significant contributor to the molecular film accumulated on the surface of LDEF.
2. Hydrocarbons are a significant contributor to the molecular film

- accumulated on the surface of LDEF.
3. The estimated total weight of outgassed material deposited on the surface of LDEF is one pound.
 4. The particle cleanliness of LDEF at launch exceeded a MIL STD 1246B level 1000.
 5. The shuttle bay is a source of contaminants.
 6. The orbital environment creates new particles and distributes particles even for passive platforms.
 7. Changes in motion free many particles from surfaces in orbit.
 8. A major redistribution of particles occurred during re-entry and the ferry flight.
 9. The current cleanliness of LDEF surfaces exceeds a MIL STD 1246B level 1000.
 10. The variety of particle types present is large.

This concludes the preliminary report.

APPENDIX 1

SPECTRA FROM INFRARED AND EDX ANALYSIS OF MOLECULAR FILMS

The following spectra are included in this set:

Chart #1: Transmission Infrared Spectra of Earth End Film, Tray G-12

Chart #2: Transmission Infrared Spectra of Space End Film, Longeron 13

Chart #3: Energy Dispersive X-ray Spectra of Earth End Film, Tray G-12

Chart #4: Energy Dispersive X-ray Spectra of Space End Film, Longeron 13

Chart #5: Transmission Infrared Spectra of Hygroscopic Material, Tray C-12

Chart #6: Infrared Spectra of Solid Film, Tray C-12

Chart #7: Reference Infrared Spectra of Tri-octyl Phosphate

Chart #8: Energy Dispersive X-ray Spectra of Ashed Film, Tray C-12

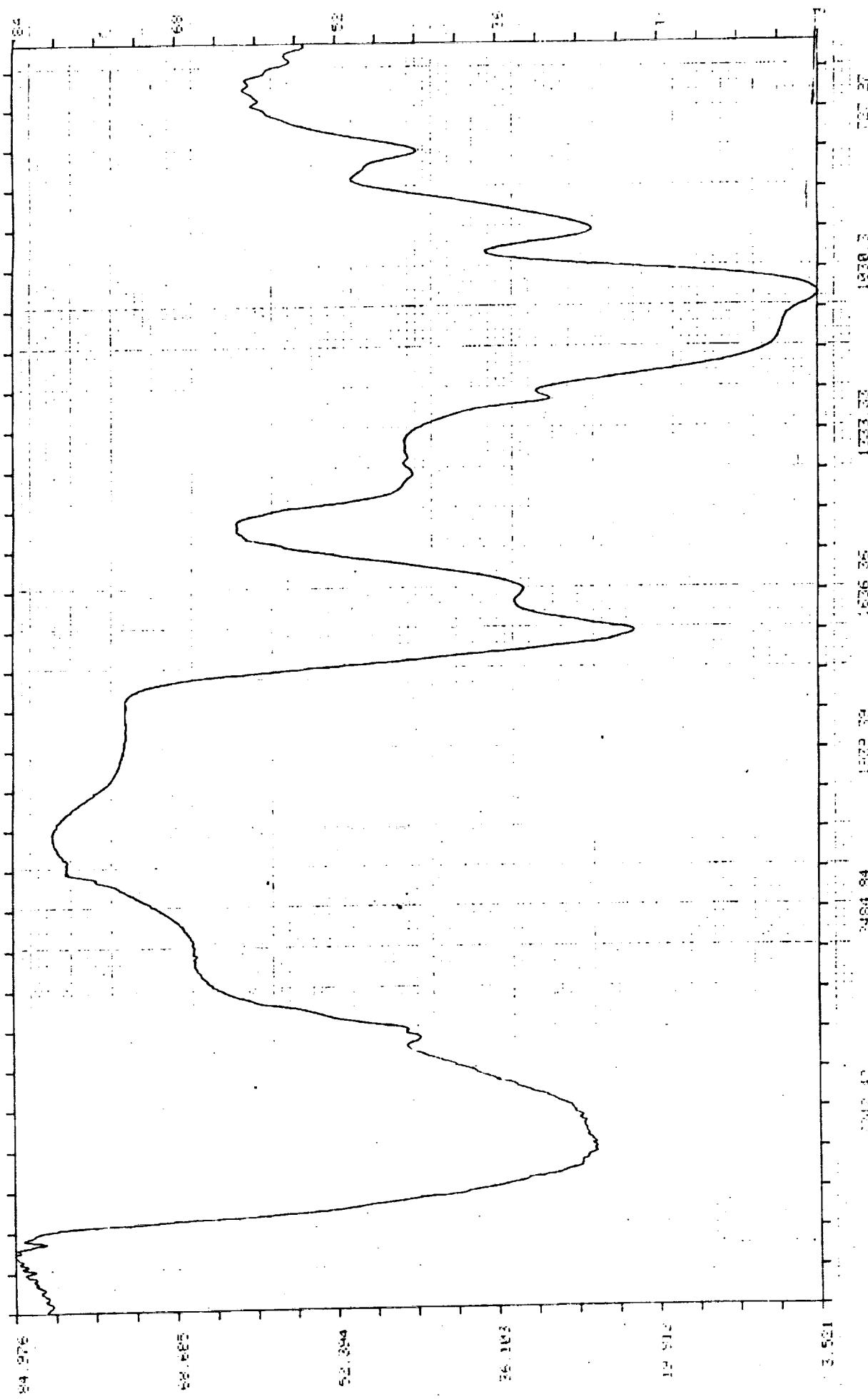
Chart #9: Characteristic Infrared Absorption Bands By Functional Group

Chart #10: Infrared Spectra of Silicone Adhesive Used on Experiment A0178

Chart #11: Infrared Spectra of the Back Side of Tray Clamp A105

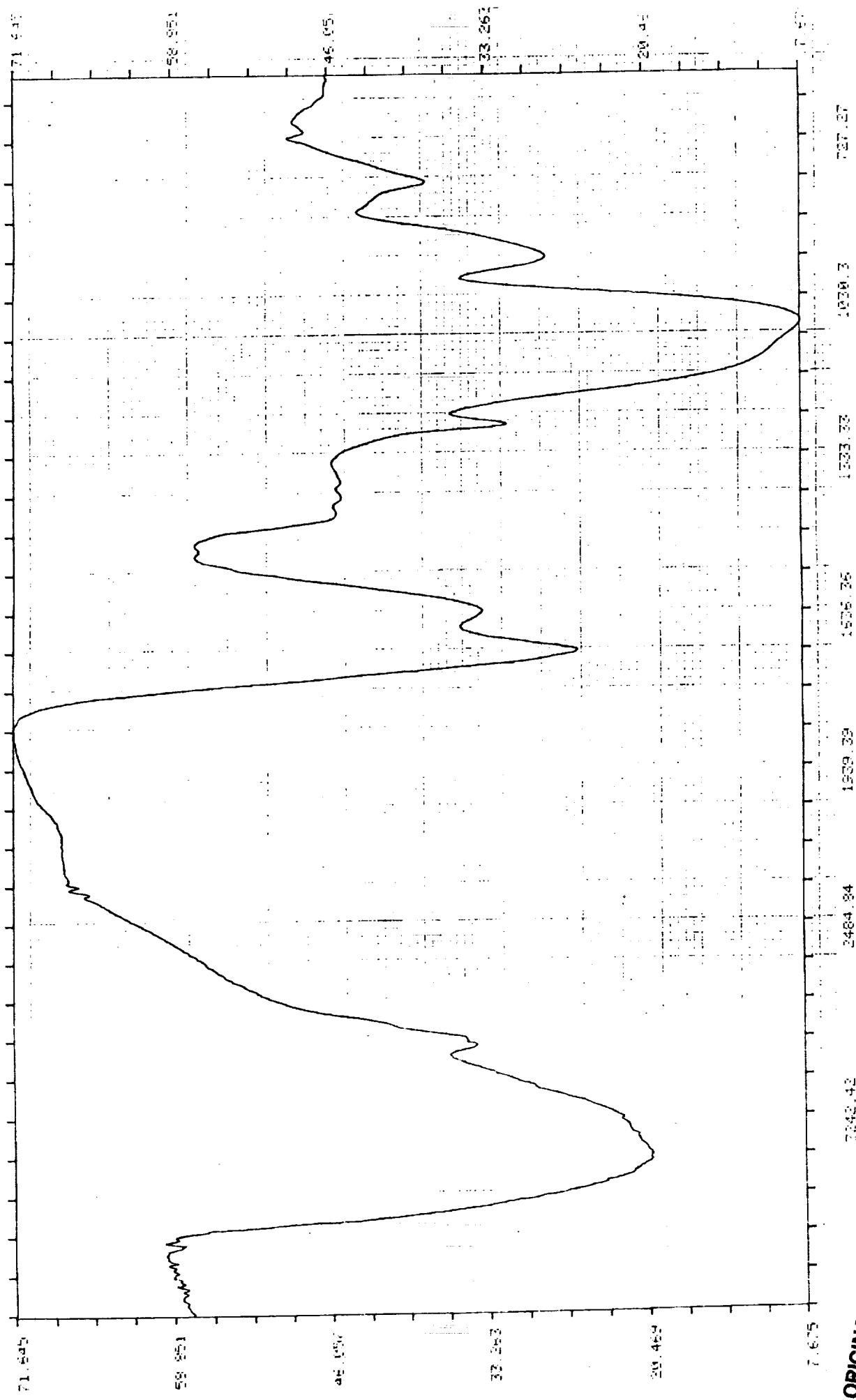
Chart #12: Infrared Spectra of the Back Side of Tray Clamp Shim C101

Chart #13: Infrared Spectra of the Front Side of Tray Clamp F094



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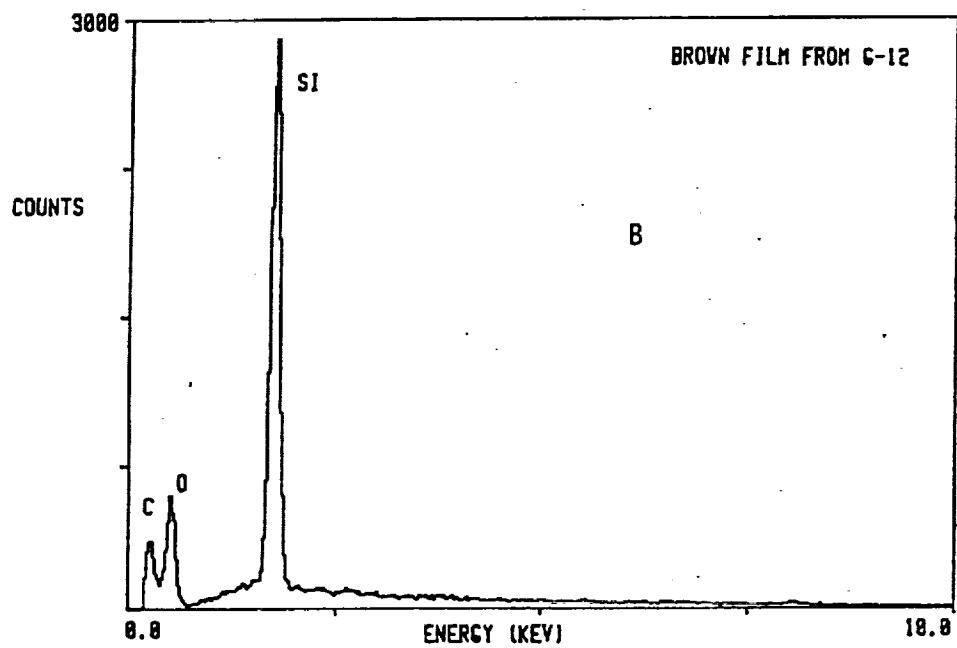
Chart #1: Transmission Infrared Spectra of Earth End Film, Tray G-12



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Chart #2: Transmission Infrared Spectra of Space End-Film, Longeron 13

Chart #3: Energy Dispersive X-ray Spectra of Earth End Film, Tray G-12



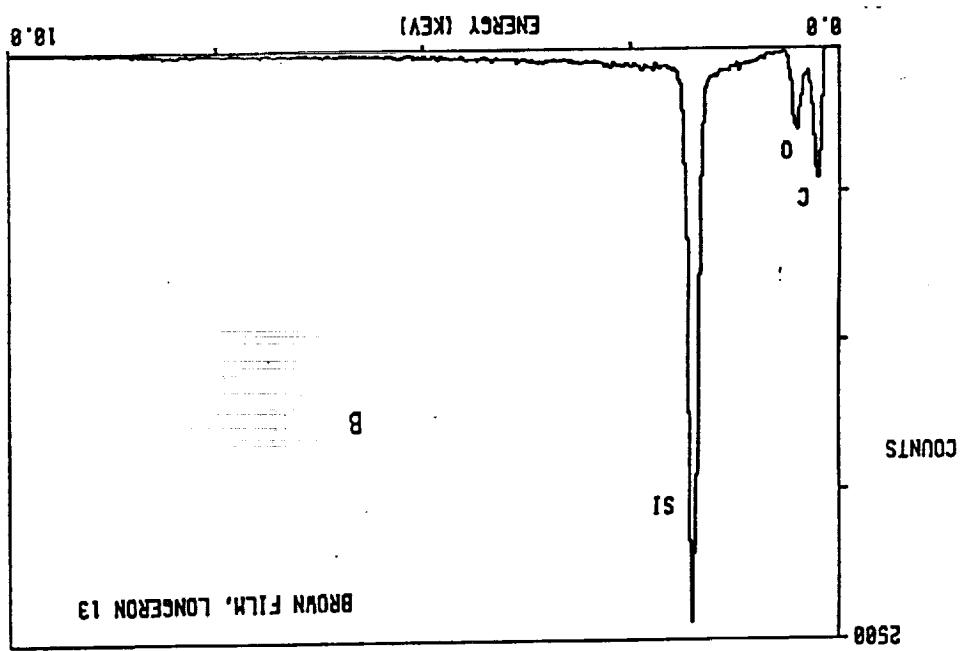


Chart #4: Energy Dispersive X-ray Spectra of Space End Film, Longeron 13

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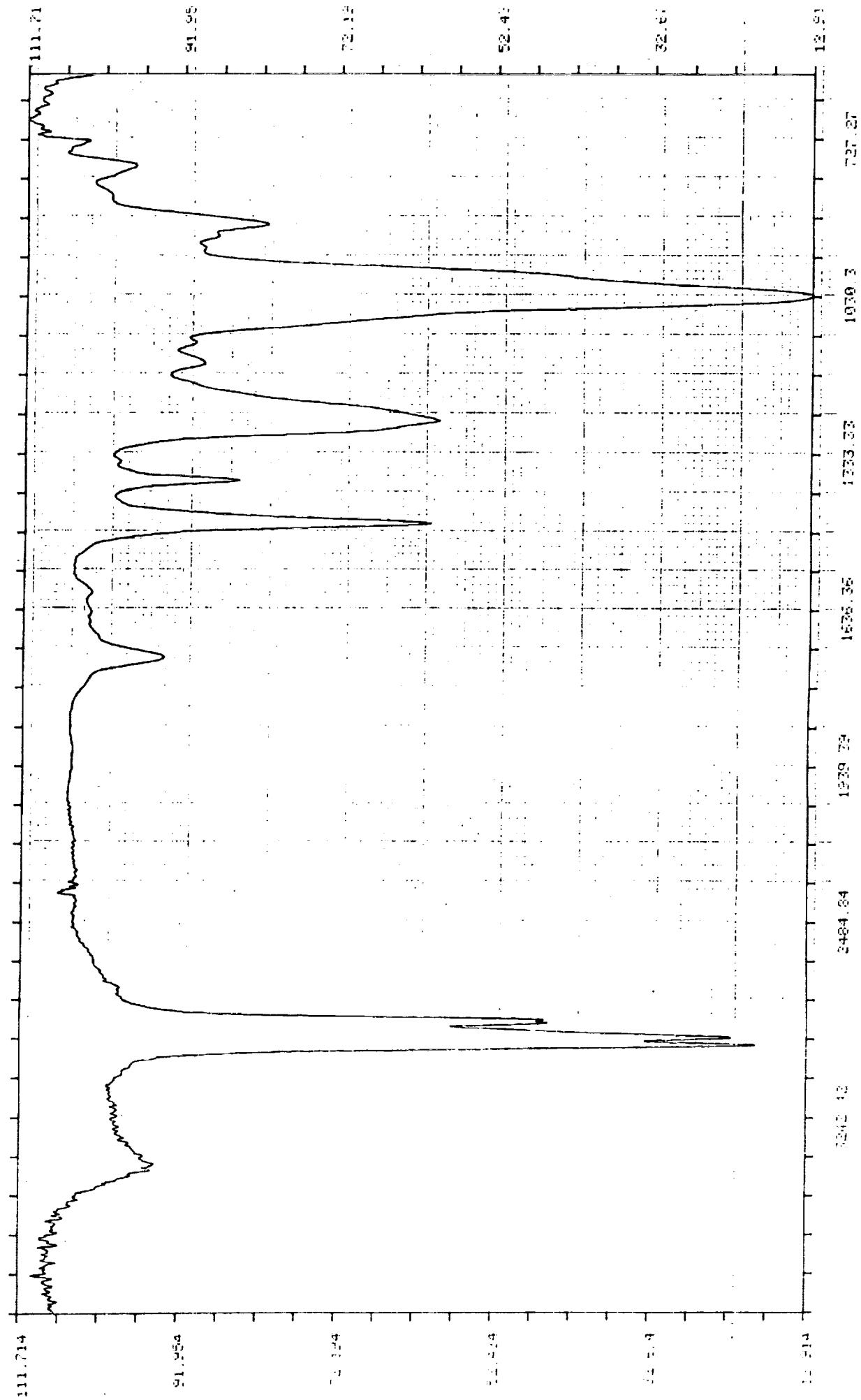
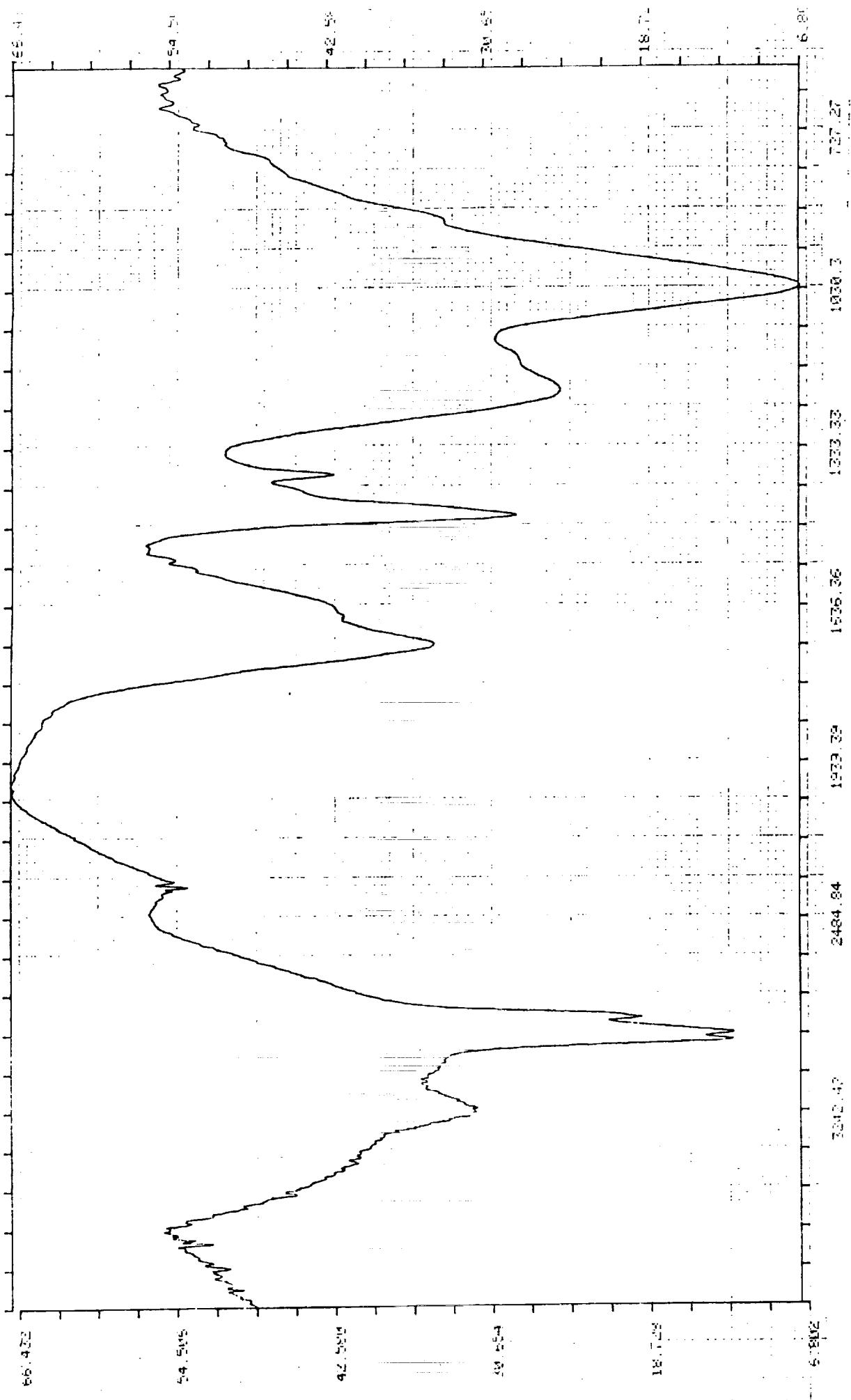


Chart #5: Transmission Infrared Spectra of Hygroscopic Material, Tray



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Chart #6: Infrared Spectra of Solid Film, Tray C-12

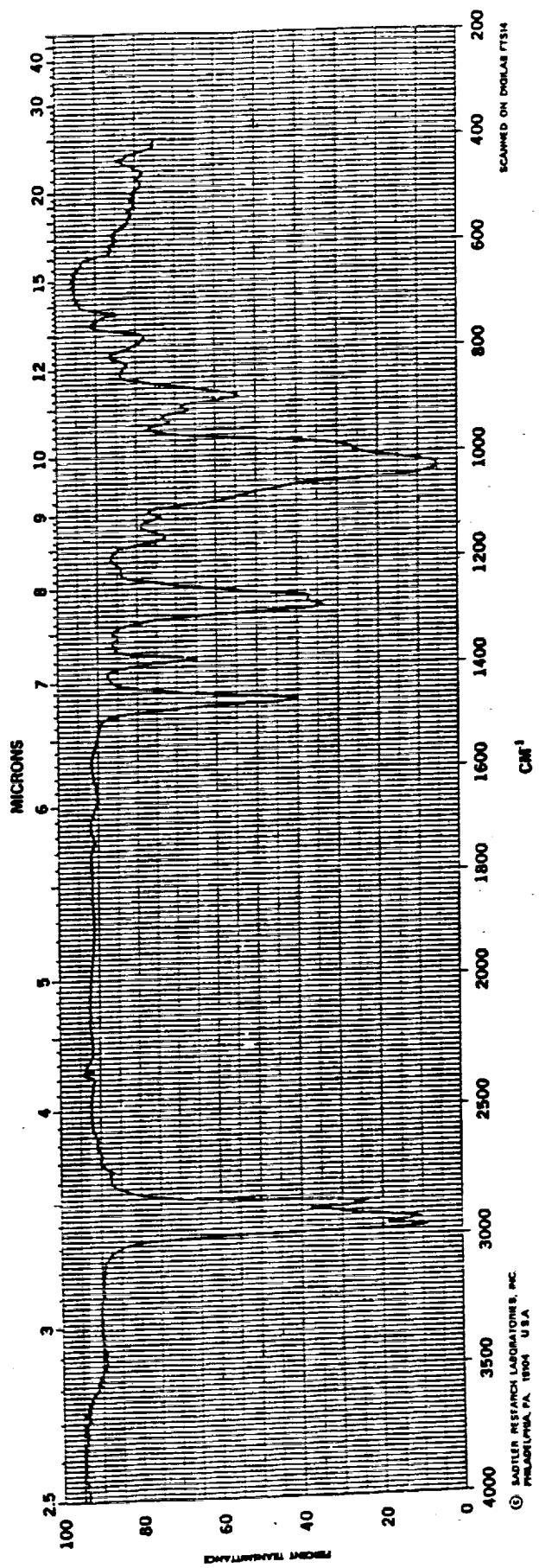
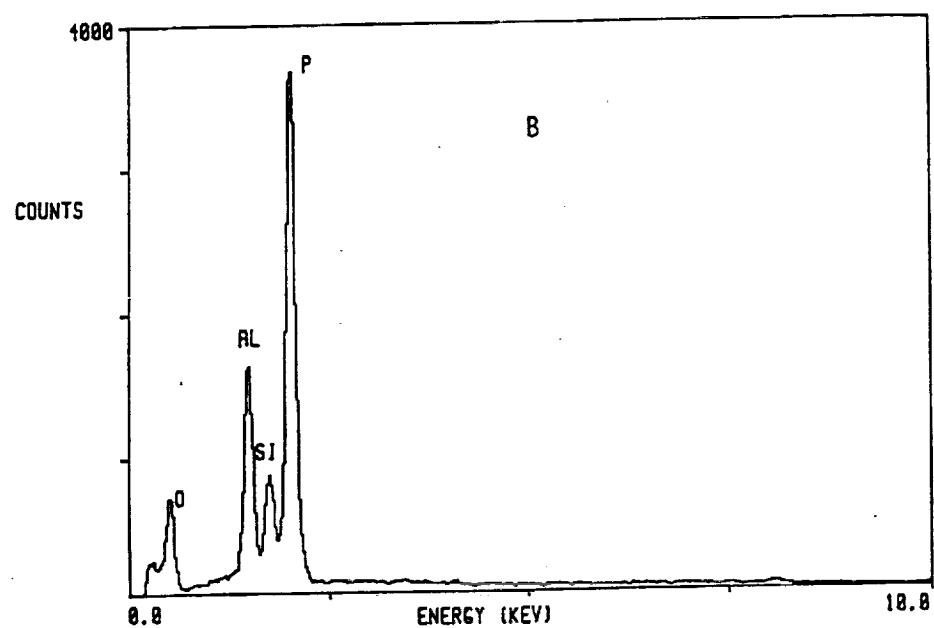


Chart #7: Reference Infrared Spectra of Tri-octyl Phosphate

Chart #8: Energy Dispersive X-ray Spectra of Ashed Film, Tray C-12



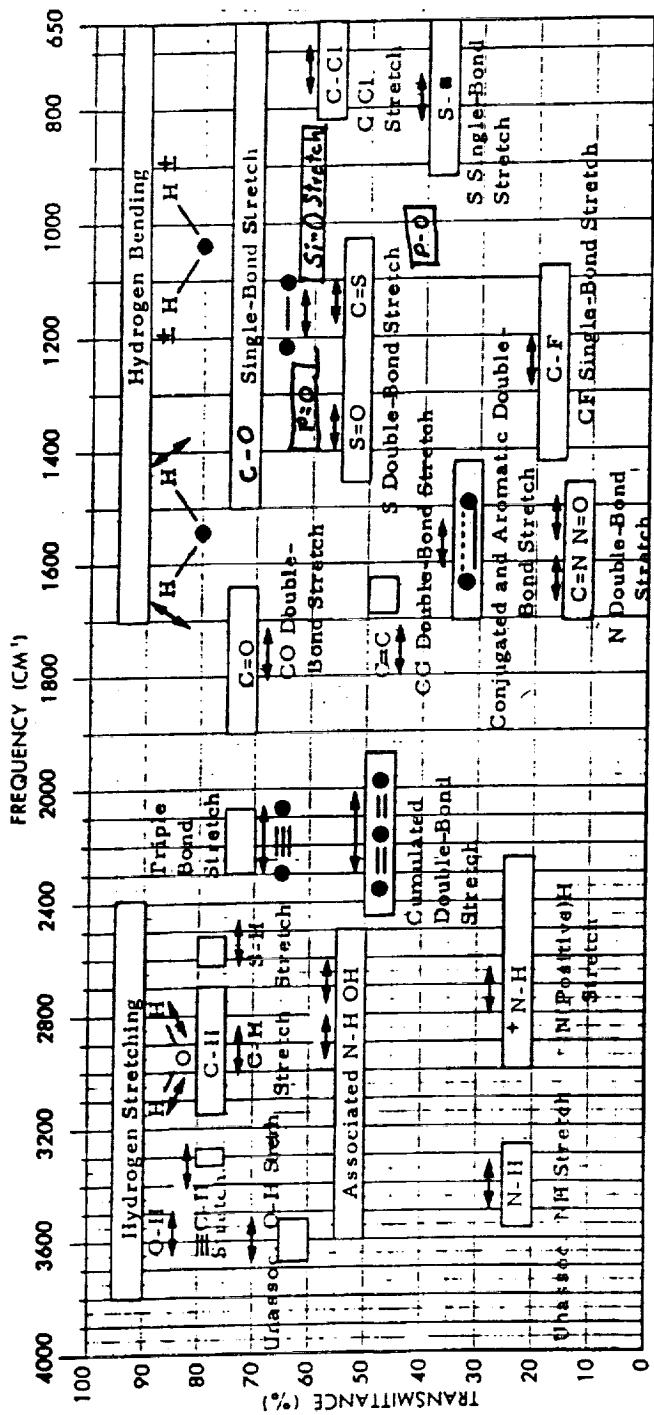
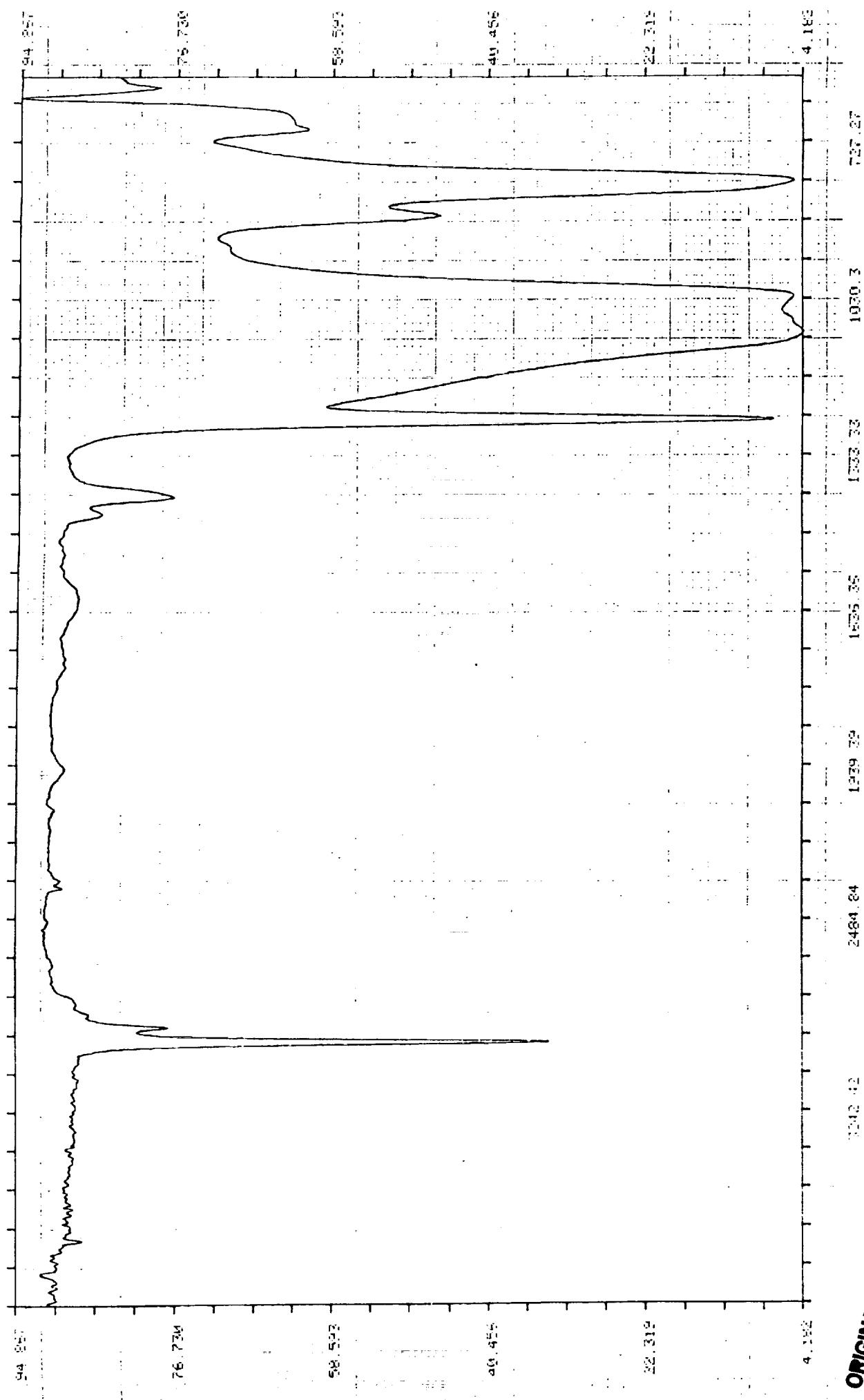


Chart #9: Characteristic Infrared Absorption Bands By Functional Group



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Chart #10: Infrared Spectra of Silicone Adhesive Used on Experiment
A0178

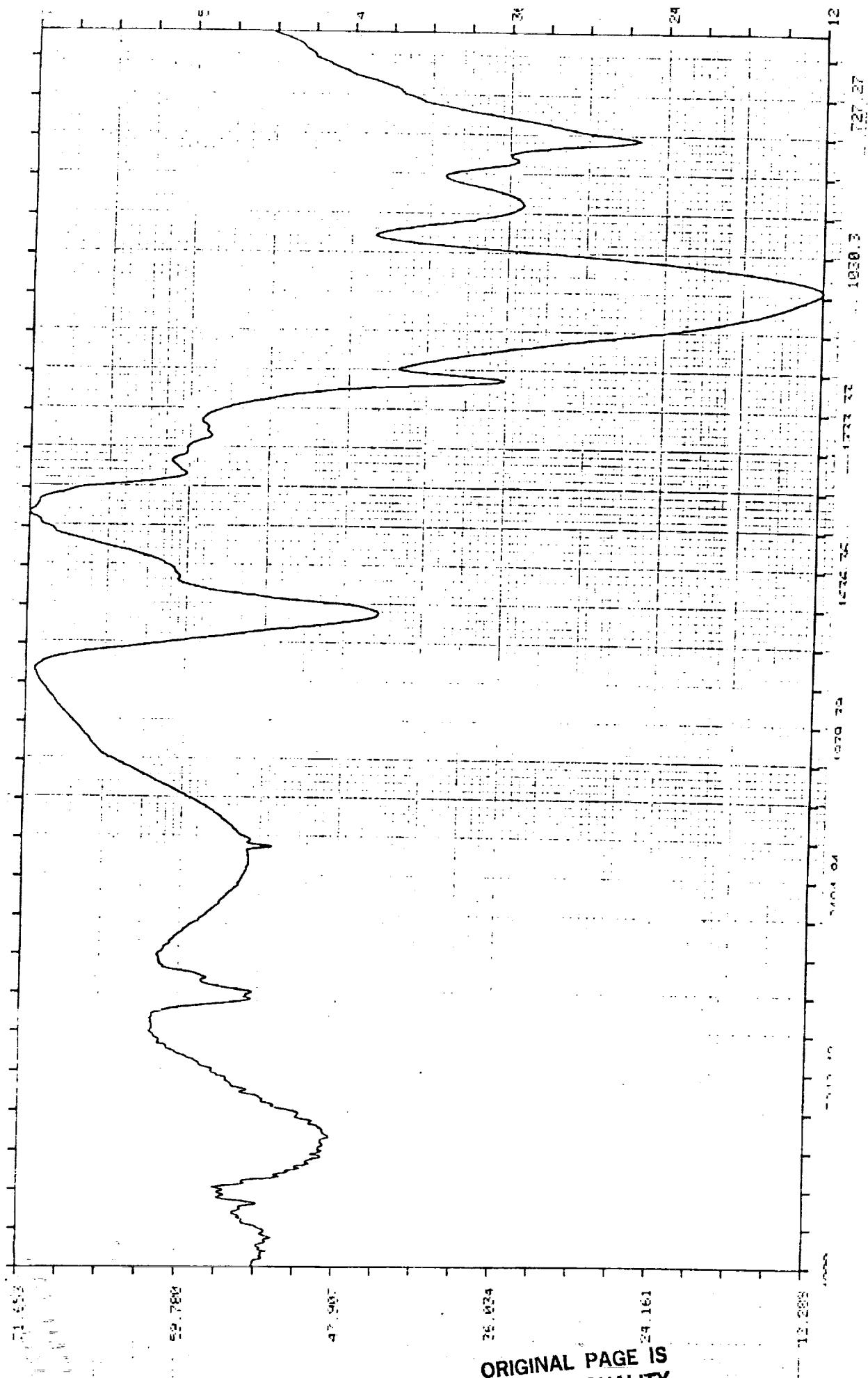


Chart #11: Infrared Spectra of the Back Side of Tray Clamp A105

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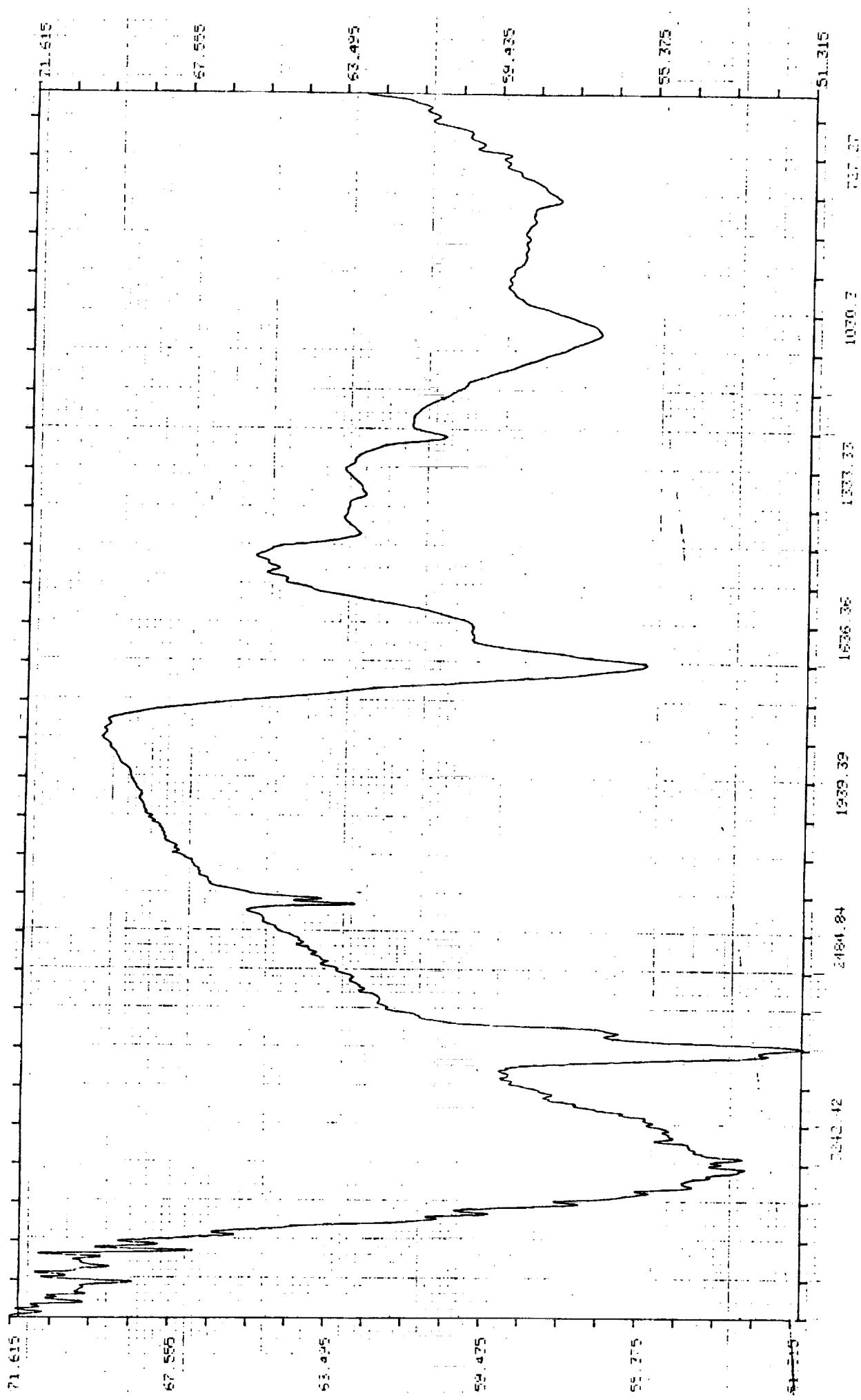


Chart #12: Infrared Spectra of the Back Side of Tray Clamp Shim C101

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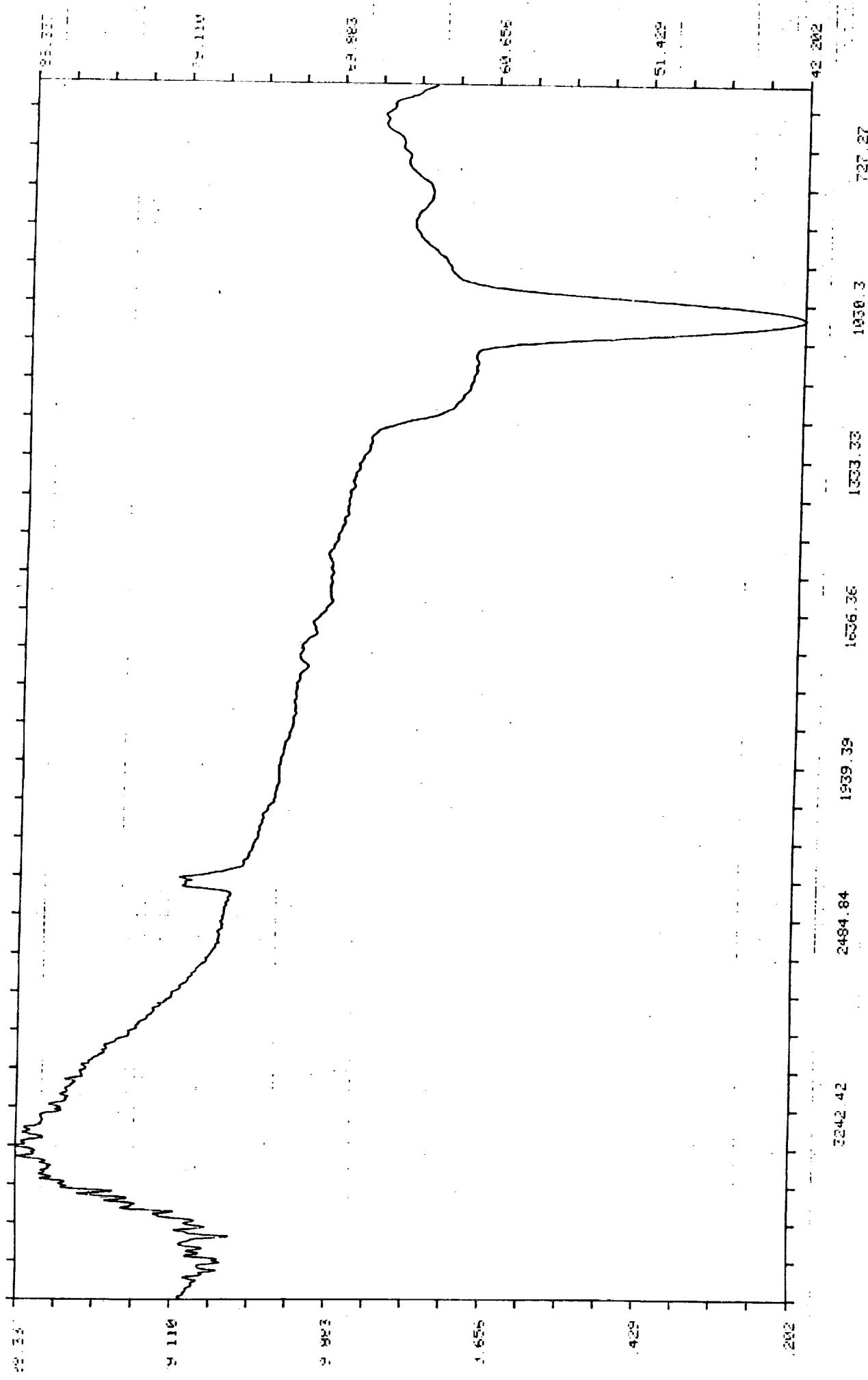


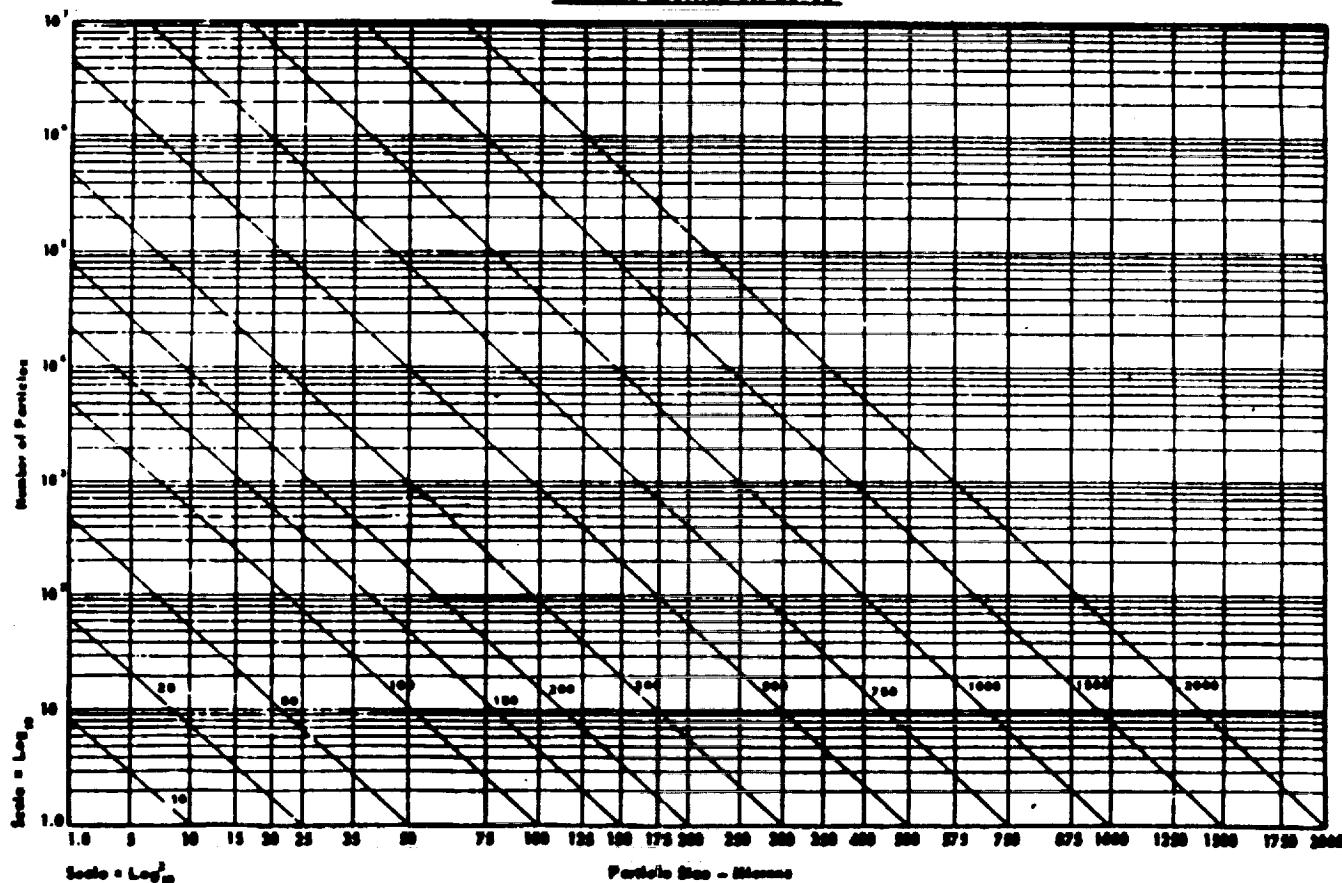
Chart #113: Infrared Spectra of the Front Side of Tray Clamp F094

APPENDIX 2

SURFACE CLEANLINESS AND PARTICLE COUNT DATA

The data listed below provides information on the cleanliness of surfaces based on tapelifts (samples 1 thru 46) and direct counts from 1def experiment or structural surfaces (samples 55 thru 62), and fallout rate data based on Shuttle bay witness plates (samples 47 and 48) and ground witness plates (samples 49 thru 54). The shuttle bay samples were not available by August 23, 1990 and will be included in later reports. Following the count data is a list of tapelift samples that identifies the source of the tapelift by kit and slide number. Below is a graph from MIL STD 1246B that is used to establish the cleanliness level of a surface based on particle count.

CHART I
PRODUCT CLEANLINESS LEVELS



MIL-STD-1246B

Appendix 2 - Continued

SURFACE CLEANLINESS AND PARTICLE FALLOUT DATA

	Sample	>25	>50	>100	>250	>500	>750	>1000
1	Kit #1 Tapelift #1 (Per Sq.In.)	160	54	14	4	1	1	0
	Square Foot Equivalent	23040	776	2016	576	144	0	0
2	Kit #1 Tapelift #2 (Per Sq.In.)	406	134	24	8	1	0	0
	Square Foot Equivalent	58464	19296	3456	1152	144	0	0
3	Kit #1 Tapelift #3 (Per Sq.In.)							
	Square Foot Equivalent							
4	Kit #1 Tapelift #4 (Per Sq.In.)	216	75	22	10	5	2	
	Square Foot Equivalent	31104	10800	3168	1440	720	288	
5	Kit #1 Tapelift #5 (Per Sq.In.)	97	44	16	8	4	3	
	Square Foot Equivalent	13968	6336	2304	1152	576	432	
6	Kit #1 Tapelift #6 (Per Sq.In.)	154	67	17	6	2	1	
	Square Foot Equivalent	22176	9648	2448	864	288	144	
7	Kit #1 Tapelift #7 (Per Sq.In.)	506	276	47	9	6	2	
	Square Foot Equivalent	72864	39744	6768	1296	864	288	
8	Kit #1 Tapelift #8 (Per Sq.In.)	442	193	101	36	15	8	
	Square Foot Equivalent	63648	27792	14544	5184	2160	1152	
9	Kit #2 Tapelift #1 (Per Sq.In.)	339	155	75	28	23	9	
	Square Foot Equivalent	48816	22320	10800	4032	3312	1296	
10	Kit #2 Tapelift #2 (Per Sq.In.)	387	191	59	22	9	2	
	Square Foot Equivalent	55728	27504	8496	3168	1296	288	
11	Kit #2 Tapelift #8 (Per Sq.In.)	206	86	32	14	7	4	

Appendix 2 - Continued

SURFACE CLEANLINESS AND PARTICLE FALLOUT DATA						
	Sample	>25	>50	>100	>250	>500
Square Foot Equivalent		29664	12384	4608	2016	1008
12 Kit #2 Tapelift #9 (Per Sq.In.)		231	139	43	27	13
Square Foot Equivalent		33264	20016	6192	3888	1872
13 Kit #3 Tapelift #1 (Per Sq.In.)		113	44	19	7	4
Square Foot Equivalent		16272	6336	2736	1008	576
14 Kit #3 Tapelift #2 (Per Sq.In.)		92	37	16	8	3
Square Foot Equivalent		13248	5328	2304	1152	432
15 Kit #3 Tapelift #4 (Per Sq.In.)		150	72	35	17	11
Square Foot Equivalent		21600	10368	5040	2448	1584
16 Kit #3 Tapelift #5 (Per Sq.In.)		120	41	12	5	3
Square Foot Equivalent		17280	5904	1728	720	432
17 Kit #3 Tapelift Blank (Per Sq.In.)		17	12	6	1	0
Square Foot Equivalent		2448	1728	864	144	0
18 Kit #4 Tapelift #1 (Per Sq.In.)		374	186	76	29	19
Square Foot Equivalent		53856	26784	10944	4176	2736
19 Kit #4 Tapelift #2 (Per Sq.In.)		403	211	92	28	8
Square Foot Equivalent		58032	30384	13248	4032	1152
20 Kit #4 Tapelift #3 (Per Sq.In.)		202	86	31	8	4
Square Foot Equivalent		29088	12384	4464	1152	576
21 Kit #4 Tapelift #5 (Per Sq.In.)		370	244	127	23	4
Square Foot Equivalent		53280	35136	18288	3312	576
						144

SURFACE CLEANLINESS AND PARTICLE FALLOUT DATA

	Sample	>25	>50	>100	>250	>500	>750	>1000
22	Kit #4 Tapelift #6 (Per Sq.In.)	461	255	111	42	22	14	10
	Square Foot Equivalent	66384	36720	15984	6048	3168	2016	1440
23	Kit #4 Blank (Per Sq.In.)	33	15	5	0	0	0	0
	Square Foot Equivalent	4752	2160	720	0	0	0	0
24	Kit #5 Tapelift #6 (Per Sq.In.)	1313	601	339	195	98	46	30
	Square Foot Equivalent	189072	86544	48816	28080	14112	6624	4320
25	Kit #5 Tapelift #7 (Per Sq.In.)	1446	748	496	311	181	129	87
	Square Foot Equivalent	208224	107712	71424	44784	26064	18576	12528
26	Kit #5 Tapelift #8 (Per Sq.In.)	1222	674	411	231	145	87	48
	Square Foot Equivalent	175968	97056	59184	33264	20880	12528	6912
27	Kit #10 Tapelift #3 (Per Sq.In.)	12237	4780	812	22	0	0	0
	Square Foot Equivalent	440532	172080	29232	792	0	0	0
28	Kit #10 Tapelift #4 (Per Sq.In.)	799	505	275	106	56	15	5
	Square Foot Equivalent	28764	18180	9900	3816	2016	540	180
29	Kit #10 Tapelift #5 (Per Sq.In.)	684	440	184	65	33	24	16
	Square Foot Equivalent	24624	15840	6624	2340	1188	864	576
30	Kit #10 Tapelift #6 (Per Sq.In.)	7892	2860	632	71	0	0	0
	Square Foot Equivalent	284112	102960	22752	2556	0	0	0
31	Kit #10 Tapelift #9 (Per Sq.In.)	7900	4195	1477	142	24	8	8
	Square Foot Equivalent	284400	151020	53172	5112	864	288	288

Appendix 2 - Continued

SURFACE CLEANLINESS AND PARTICLE FALLOUT DATA						
	Sample	>25	>50	>100	>250	>500
32	Kit #10 Tapelift #10 (Per Sq.In.)	11285	4356	925	79	11
	Square Foot Equivalent	406260	156816	33300	2844	396
33	Kit #10 Tapelift #15 (Per Sq.In.)	3299	1209	330	86	20
	Square Foot Equivalent	118764	43524	11880	3096	720
34	Kit #11 Tapelift #1 (Per Sq.In.)	8473	2923	435	20	0
	Square Foot Equivalent	305028	105228	15660	720	0
35	Kit #11 Tapelift #3 (Per Sq.In.)	516	256	130	73	43
	Square Foot Equivalent	18576	9216	4680	2628	1548
36	Kit #11 Tapelift #4 (Per Sq.In.)	221	73	21	7	5
	Square Foot Equivalent	7956	2628	756	252	180
37	Kit #11 Tapelift #6 (Per Sq.In.)	391	142	24	8	4
	Square Foot Equivalent	14076	5112	864	288	144
38	Kit #11 Tapelift #11 (Per Sq.In.)	1293	775	486	50	21
	Square Foot Equivalent	46548	27900	17496	1800	756
39	Kit #12 Tapelift #2 (Per Sq.In.)	2986	1036	275	38	20
	Square Foot Equivalent	107496	37296	9900	1368	720
40	Kit #12 Tapelift #16 (Per Sq.In.)	9865	3960	1580	79	0
	Square Foot Equivalent	355140	142560	56880	2844	0
41	Kit #14 Tapelift #5 (Per Sq.In.)	668	343	124	24	7
	Square Foot Equivalent	24048	12348	4464	864	252
42	Kit #14 Tapelift #9 (Per Sq.In.)	11274	5383	1602	146	11
						0

Appendix 2 - Continued

SURFACE CLEANLINESS AND PARTICLE FALLOUT DATA						
	Sample	>25	>50	>100	>250	>500
Square Foot Equivalent	405864	193788	57672	52556	396	0
43 Kit #30 Tapelift #7 (Per Sq.In.)	316	83	17	5	1	0
Square Foot Equivalent	11376	2988	612	180	36	0
44 Kit #30 Tapelift #8 (Per Sq.In.)	368	166	54	20	6	1
Square Foot Equivalent	13248	5976	1944	720	216	36
45 Kit #30 Tapelift #9 (Per Sq.In.)	1000	351	76	15	5	3
Square Foot Equivalent	36000	12636	2736	540	180	108
46 Kit #30 Tapelift #12 (Per Sq.In.)	470	198	46	7	3	1
Square Foot Equivalent	16920	7128	1656	252	108	36
47 IOC M. Launch to Landing						
Square Foot Equivalent						
48 IOC M. Ferry Flight						
Square Foot Equivalent						
49 Cannister Fallout Rate Sq.Ft./24Hrs	270	39	0	0	0	0
Actual Total Count All 4 Samples	24	3	0			
50 O&C To SAEF-2 Fallout Rate Sq.Ft./24 Hrs.	130	21	14	10	3	0
Actual Total Count All 6 Samples	38	6	4	3	1	0
51 SAEF-2, Jan. Fallout Rate Sq.Ft./24 Hrs.	49	12	6	4	1	0
Actual Total Count, All 9 Samples	60	15	7	5	1	0
52 SAEF-2, Feb. Fallout Rate Sq.Ft./24 Hrs.	53	12	7	4	0	0
Actual Total Count, All 6 Samples	42	10	6	3	0	0

Appendix 2 - Continued

SURFACE CLEANLINESS AND PARTICLE FALLOUT DATA						
	Sample	>25	>50	>100	>250	>500
Lats, Feb. Fallout Rate Sq.Ft./24 Hrs.		113	21	10	5	5
Actual Total Count, All 6 Samples	65	12	6	3	3	3
53 SAEF-2, March Fallout Rate Sq.Ft./24 Hrs.	59	11	4	3	3	2
Actual Total Count, All 6 Samples	51	9	3	2	2	1
Lats, March Fallout Rate Sq.Ft./24 Hrs.	143	31	11	2	1	0
Actual Total Count, All 8 Samples	144	32	12	2	1	0
54 SAEF-2, April Fallout Rate Sq.Ft./24 Hrs.	54	12	5	1	1	1
Actual Total Count, All 6 Samples	31	6	4	1	1	1
Lats, April Fallout Rate Sq.Ft./24 Hrs.	172	47	14	4	3	2
55 Tray E-02, Clamp 8 Paint Spot	19	12	6	4	3	2
Square Foot Equivalent	111475	70405	35202	11734	8801	5867
56 Tray A-02 (Total/0.03 Sq.In.)	56	20	7	3	2	1
Transferred Particles	12	7	1			
Square Foot Equivalent	270372	96561	33797	14484	9656	4828
57 Tray A-02 (Total/0.09 Sq.In.)	84	27	10	5	3	1
Square Foot Equivalent	164248	55844	19710	9855	8212	4927
Particles Fixed Since Orbit Insertion	41	13	3	1	1	0
Relocated or Add Particles	43	14	7	2	2	1
Particle Prints Without Particles	18	7	2	1	0	0
On Orbit	59	20	5	2	1	0
58 Tray D-03 Smooth Composite (0.05 Sq.In.)	88	33	8	0	0	0
Square Foot Equivalent	253440	95040	23040	0	0	0
59 Tray D-03 Metal Bracket (0.05 Sq.In.)	63	12	6	2	2	2
Square Foot Equivalent	181440	34560	17280	5760	5760	5760

Appendix 2 - Continued

SURFACE CLEANLINESS AND PARTICLE FALLOUT DATA						
		>25	>50	>100	>250	>500
60	Tray D-03 Teflon Surface (0.09 Sq.In.)	70	16	7	5	4
	Square Foot Equivalent	114940	26272	11494	8210	6568
61	Tray A-10 (Total/0.1 Sq.In.)	43	10	9	4	3
	On Orbit	64	19	5	3	2
62	Tray E-10 (Total/0.1 Sq.In.)	82	23	9	2	2
	On Orbit	79	19	7	3	2
					1	0
						0

TAPELIFT STATUS

LOCATION OF TAPELIFT

DATE OF KIT SLIDE SAMPLING	(TRAY LOCATION, X & Y COORDINATES, AND DESCRIPTION, INCLUDING EXPERIMENT #)	DATE RECEIVED
1C 1 1-19-90	Edwards, on landing, blanket above purge duct, Stbd	
1C 2 1-19-90	Edwards, on landing, As above, Port side	
1C 3 1-19-90	Edwards, on landing, Sample touched Port purge duct	
1C 4 1-19-90	Edwards, Resample of 1 after PLB Operations	
1C 5 1-19-90	Edwards, Resample of 2 after PLB Operations	
1C 6 1-19-90	Edwards, Resample of 3 after PLB Operations	
1C 7 1-19-90	Edwards, Pre-Ferry, Stbd Blanket near adapter plate	
1C 8 1-19-90	Edwards, Pre-Ferry, Stbd Blanket cent sq one from PSA 1o	
2C 1	KSC, OPF, Resample of 1-08, after lifting OPS	
2C 2	KSC, OPF, Near aft PSA Blanket after lifting OPS	
2C 8	KSC, OPF, Resample of 2-09 after lifting OPS	
2C 9 1-19-90	Edwards, Pre-Ferry, Port Blanket near optical target	
3C 1 2-1-90	OPF, Pre-trans, Frwd base panel below trunion, Port side	
3C 2 2-1-90	OPF, Pre-trans, Frwd base panel below trunion, Stbd side	
3C 3 2-1-90	OPF, Pre-trans,	
3C 4 2-1-90	OPF, Pre-trans, Aft base panel below trunion, Port side	
3C 5 2-1-90	OPF, Pre-trans, Aft base panel below trunion, Stbd side	
3C 7 2-1-90	OPF, Pre-trans, Blank Tape Lift	
4C 1 2-4-90	O&C, Pre-trans, Fwrd sec., LATS Stbd Floor	
4C 2 2-4-90	O&C, Pre-trans, Mid sec., LATS Floor, Stbd side	
4C 3 2-4-90	O&C, Pre-trans, Aft sec., LATS Stbd Floor	
4 4 2-4-90	O&C, Pre-trans, Aft sec., LATS Port Floor	
4C 5 2-4-90	O&C, Pre-trans, Mid sec., LATS Port Floor	
4C 6 2-4-90	O&C, Pre-trans, Fwrd sec., LATS Port Floor	
4C 7 2-4-90	O&C, Pre-trans, Blank Tapelift	
5C 1 2-1-90	O&C, Post-trans, Fwrd base panel below Port Trunion	
5C 2 2-1-90	O&C, Post-trans, Fwrd base panel below Stbd Trunion	
5C 3 2-1-90	O&C, Post-trans, Aft base panel below Port Trunion	
5C 4 2-1-90	O&C, Post-trans, Aft base panel below Stbd Trunion	
5C 5 2-1-90	O&C, Post-trans, Blank Tapelift	
5C 6 2-1-90	O&C, Post-trans, SYNCOM Cradle	
5C 7 2-1-90	O&C, Post-trans, SYNCOM Cradle	
5C 8 2-1-90	O&C, Post-trans, SYNCOM Cradle	
5 9 2-1-90	O&C, Post-trans, SYNCOM Cradle	
6C 1 2-4-90	SAEF-2, Post-trans, Frwd sec., LATS Stbd Floor	
6C 2 2-4-90	SAEF-2, Post-trans, Mid sec., LATS Stbd Floor	
6C 3 2-4-90	SAEF-2, Post-trans, Aft sec., LATS Stbd Floor	
6C 4 2-4-90	SAEF-2, Post-trans, Aft sec., LATS Port Floor	
6C 5 2-4-90	SAEF-2, Post-trans, Mid sec., LATS Port Floor	
6 6 2-4-90	SAEF-2, Post-trans, Frwd sec., LATS Port Floor	
6C 7 2-4-90	SAEF-2, Post-trans, Blank Tapelift	
7 1-10	KSC	
8 1-10	KSC	
9C 1 2-1-90	SAEF-2, Pre-LDEF, CleanBench work surface	
9 2 2-1-90	SAEF-2, Pre-LDEF, Tile floor middle area	
9C 3 2-1-90	SAEF-2, Pre-LDEF, Concrete floor middle area	
9 4 2-1-90	SAEF-2, Pre-LDEF, Floor of 8' Platform	
9 5 2-1-90	SAEF-2, Pre-LDEF, Equip Loc, W wall, S Rm.	
9 6 2-1-90	SAEF-2, Pre-LDEF, Tray Hoist	
9 7 2-1-90	SAEF-2, Pre-LDEF, Stairs of 12' Stand	

9C	8	2-1-90	SAEF-2, Pre-LDEF, Mike Box, E Wall
9C	9	2-1-90	SAEF-2, Pre-LDEF, Krypton Vent pipe, S wall
9C	10	2-1-90	SAEF-2, Pre-LDEF, LN2 Tanks for GeLi Detectors
9C	11	2-1-90	SAEF-2, Pre-LDEF, Floor, E wall Observation window
9	12	2-1-90	SAEF-2, Pre-LDEF, Video Camera and Stand, air shower
9C	13	2-1-90	SAEF-2, Pre-LDEF, Forklift
9C	14	2-1-90	SAEF-2, Pre-LDEF, Floor in front of airlock door, N wall
9	15	2-1-90	SAEF-2, Pre-LDEF, Top of Blue Box, W wall
9	16	2-1-90	SAEF-2, Pre-LDEF, Top of Ladder Platform, W wall
9	17	2-1-90	SAEF-2, Pre-LDEF, Top of check-out Unit, W wall
9	18	2-1-90	SAEF-2, Pre-LDEF, Floor near GeLi Detectors
9C	19	2-1-90	SAEF-2, Pre-LDEF, Floor 10' in front of Obs. Window
9C	20	2-1-90	SAEF-2, Pre-LDEF, Floor, W side of LDEF Outline
9C	21	2-1-90	SAEF-2, Pre-LDEF, CleanRoom Shoe Sole after work
10	1	2-9-90	SAEF-2, IMAX, Floor, inside airlock door, W wall
10C	2	2-9-90	SAEF-2, IMAX, Floor, near Observation window
10C	3	2-9-90	SAEF-2, IMAX, Floor, W area near air return
10C	4	2-9-90	SAEF-2, IMAX, LATS between rows D and E, E side
10C	5	2-9-90	SAEF-2, IMAX, LATS row D, W side, 2 lifts
10C	6	2-9-90	SAEF-2, IMAX, Floor, edge of LATS, W side
10	7	2-9-90	SAEF-2, IMAX, Cleanbench work surface (off)
10C	8	2-9-90	SAEF-2, IMAX, M&D Work station table, W wall
10C	9	2-9-90	SAEF-2, IMAX, Concrete Floor, E wall near phone
10C	10	2-9-90	SAEF-2, IMAX, Clean Room Shoe Sole after work, 2 lifts
10	11	2-9-90	SAEF-2, IMAX, Table top, W wall near Emg. Exit
10	12	2-9-90	SAEF-2, IMAX, Table in NW Corner, Camera Stuff
10	13	2-9-90	SAEF-2, IMAX, Video Camera and stand near Air Shower
10	14	2-9-90	SAEF-2, IMAX, Fiber on box #175B, near Air Shower
10C	15	2-9-90	SAEF-2, IMAX, Floor of 8' Platform, NW Corner
11	1	2-15-90	SAEF-2, 4 LIFTS, TABLE NEAR MIDDLE AIR RETURN COLUMN
11C	2	2-15-90	SAEF-2, 4 LIFTS, RETRACTABLE STAIRS
11C	3	2-15-90	SAEF-2, 4 LIFTS, TOP OF COMPUTER BENCH, M&D AREA
11C	4	2-15-90	SAEF-2, 4 LIFTS, TOP OF MEASURING TABLE, M&D AREA
11C	5	2-15-90	SAEF-2, 4 LIFTS, TOP OF DOCUMENTATION TABLE, M&D AREA
11C	6	2-15-90	SAEF-2, 4 LIFTS, LAMINAR FLOW BENCH TABLE, M&D AREA
11	7	2-15-90	SAEF-2, SELLECTED DEBRIS FROM HYDRAULIC LIFT
11C	8	2-15-90	SAEF-2, 4 LIFTS, HYDRAULIC LIFT
11	9	2-15-90	SAEF-2, 4 LIFTS, JACK STRUCTURE, HYDRAULIC LIFT
11C	10	2-15-90	SAEF-2, 4 LIFTS, SPACE END, RUGHT CORNER OF LATS
11C	11	2-15-90	SAEF-2, 4 LIFTS, LATS NEXT TO WITNESS PLATE
11C	12	2-15-90	SAEF-2, 4 LIFTS, LATS EARTH END, OBS.WINDOW SIDE
11C	13	2-15-90	SAEF-2, 4 LIFTS, FLOOR NEAR EARTH END
12C	1	2-24-90	TRAY D-07 BACKSIDE, ONE LIFT OFF INITIATE BOX (EIS)
12C	2	2-24-90	TRAY D-07 BACKSIDE, FOUR LIFTS OFF INITIATE BOX (EIS)
12C	3	2-24-90	TRAY D-07 BACKSIDE, FOUR LIFTS OFF BATTERY BOX
12C	4	2-24-90	SAEF-2, 4 LIFTS OF FLOOR UNDER PARTICLE COUNTER
12C	5	2-24-90	SAEF-2, 4 LIFTS FROM PHOTOROOM FLOOR, LEFT OF TRAY
12C	6	2-24-90	SAEF-2, 4 LIFTS FROM PHOTOROOM WALL, BEHIND TRAY
12C	7	2-24-90	SAEF-2, 4 LIFTS OF TOP OF PHOTOROOM FILE CABINET
12C	8	2-24-90	SAEF-2, 4 LIFTS OFF GRILL, FIRST COLUMN NEAR EARTH END
12C	9	2-24-90	SAEF-2, 4 LIFTS OFF GRILL 90 DEGREES FROM TAPELIFT #8
12C	10	2-24-90	SAEF-2, 4 LIFTS FROM FLOOR IN FRONT OF NORTH DOOR
12C	11	2-24-90	SAEF-2, 4 LIFTS FROM FLOOR IN FRONT OF AIR LOCK DOOR
12C	12	2-24-90	SAEF-2, 4 LIFTS OFF LATS (TRAILER), SOUTHEAST CORNER
12C	13	2-24-90	SAEF-2, 4 LIFTS OFF LATS, MIDDLE SOUTH SIDE
12C	14	2-24-90	SAEF-2, 4 LIFTS, LATS SOUTHWEST CORNER (CLOSEST TO CRANE
12C	15	2-24-90	SAEF-2, 4 LIFTS, BACK SIDE, TRAY HOLDER #3 (C08)
12C	16	2-24-90	SAEF-2, 4 LIFTS OFF FLOOR IN FRONT OF NOMARSKI SET-UP
13	1	2-28-90	TRAY D-09, FRAME X130 & Y28, ONE LIFT
13	2	2-28-90	TRAY D-09, FRAME X110 & Y58, EXP. LIP, ONE LIFT

13 3 2-28-90 TRAY D-09, FRAME X120 & Y102, FRAME RIM, ONE LIFT
13 4 TRAY E-12, OUTSIDE, AROUND CONNECTOR, A0038
13 5 TRAY F-06, OUTSIDE, AROUND CONNECTOR
13 6 TRAY B-03, EXP. A0138, 4 LIFTS, INSIDE BOTTOM
13 7 TRAY B-03, EXP. A0138, 1 LIFT, LOWER LEFT SIDE
13 8 TRAY B-03, EXP. A0138, 2 LIFTS, UPPER LEFT WIRE MESH
13 9 TRAY B-03, EXP. A0138, 4 LIFTS, INSIDE
13 10 TRAY B-03, EXP. A0138,
13 11 TRAY B-03, EXP. A0138,
13 12 TRAY B-03, EXP. A0138,
13 13 TRAY B-03, EXP. A0138,
13 14 TRAY B-03, EXP. A0138,
13 15 TRAY B-03, EXP. A0138,
13 16 TRAY B-03, EXP. A0138,
13 17 TRAY B-12, EXP. A0201, BROWN DEPOSIT
13 18 TRAY B-12, EXP. A0201, OXIDIZED PAINT, BTM EDGE, COVER
13 19 TRAY B-12, EXP. A0201, RED PWDR, INSIDE FRAME ON BLK TC
13 20 TRAY G-06, COVER PLATE DARK AREA
13 21 TRAY G-06, COVER PLATE LIGHT AREA
13 22 SAEF-2, SCAFFOLDING, A ROW OF LDEF
13 23 SAEF-2, SCAFFOLDING, C ROW OF LDEF
13 24 SAEF-2, SCAFFOLDING, E ROW OF LDEF
13 25 SAEF-2, SCAFFOLDING, H END OF LDEF

14 1 2-27-90 SAEF II, 4 LIFTS, FLOOR UNDER PARTICLE COUNTER
14C 2 2-27-90 SAEF II, 4 LIFTS, PHOTOROOM FLOOR IN FRONT OF OUTER DOOR
14 3 2-27-90 SAEF II, 4 LIFTS, DOOR IN PHOTOROOM TO OUTSIDE
14 4 2-27-90 SAEF II, 4 LIFTS, FLOOR UNDER DESK IN PHOTOROOM
14 5 2-27-90 SAEF II, 4 LIFTS, LATS, SOUTHEAST CORNER
14 6 2-27-90 SAEF II, 4 LIFTS, LATS, SOUTH SIDE MIDDLE
14 7 2-27-90 SAEF II, 4 LIFTS, LATS, SOUTHWEST CORNER
14C 8 2-27-90 SAEF II, 4 LIFTS, FLOOR UNDER CRANE
14 9 2-27-90 SAEF II, 4 LIFTS, FLOOR JUST OUTSIDE OF M & D SIG AREA
14C 10 2-27-90 SAEF II, 4 LIFTS, HORIZ. BAR BETWEEN TABLE LEGS IN M&D
14 11 2-27-90 SAEF II, 4 LIFTS, WALL NEXT TO OUTSIDE DOOR IN M&D
14 12 2-27-90 SAEF II, 4 LIFTS, FLOOR IN FRONT OF NOMARSKI SET-UP
14 13 2-27-90 SAEF II, 4 LIFTS, METAL CART WITH THE MONITOR FOR NOMARS
14 14 2-27-90 FOUR LIFTS OFF THIRD WORK TABLE FROM EAST WALL
14 15 2-27-90 AIRLOCK, 4 LIFTS, TOP SURFACE OF PAINTED WOODEN BOX
14 16 2-27-90 AIRLOCK, 4 LIFTS, OFF CONTAINERS EXPOSED FOR 2-DAYS
14 17 2-27-90 AIRLOCK, 4 LIFTS OFF FLOOR
14C 18 2-27-90 SAEF-2, 4 LIFTS OFF FLOOR IN TRAY PACKAGEING AREA

15 1

16 1

17 1-15 FRANCE

18 1-15 FRANCE

19 1

20 1

20 2

20 3

20 4

21 1-25 Aerospace

22 1 3-1-90 LDEF, 1 LIFT, HORIZONTAL I-BEAM UNDER M0002-1 OF D03

22 2 3-1-90 SAEF-2, TOP OF INSTRUMENT CART

22C 3 3-1-90 SAEF-2, FLOOR CLEANROOM SIDE OF AIRLOCK

22 4 3-1-90 SAEF-2, FLOOR IN FRONT OF AIR EXHAUST VENT NEAR AIRLOCK

22 5 3-1-90 SAEF-2, SURFACE OF SHIPING CONTAINER
22C 6 3-1-90 SAEF-2, SHELF INSIDE STORAGE CABINET
22 7 3-1-90 SAEF-2, FLOOR UNDER TELEPHONE NEAR EXIT
22C 8 3-1-90 SAEF-2, SHELF INSIDE BAG STORAGE CABINET
22C 9 3-1-90 SAEF-2, TOP OF TV MONITOR
22C 10 3-1-90 SAEF-2, RETURN AIR VENT, MSIG AREA
22 20 3-1-90 USED AS A COVER FOR SLIDE #1

23 1

24C 1 LATS FLOOR, 4 LIFTS, CENTER, EAST SIDE
24 2 SAEF-2, 4 LIFTS, TRAY ROTATOR,
24C 3 SAEF-2, FLOOR UNDER PARTICLE COUNTER
24C 4 LATS, 4 LIFTS, SPACE END
24 5 SAEF-2, 1 LIFT, TRAY HOIST FIXTURE WINCH
24 6 SAEF-2, 3 LIFTS, FLOOR OUTSIDE PHOTO ROOM
24 7 STORAGE BOX FLY
24 8 TRAY ?-03, EXP A0187-1, DRIP EPOXY SCRAPING INSIDE TRAY
24 9 TRAY H7, POWDER UNDER
24 10 Tray B-8, A0056
24 11 Tray B-8, A0056
24 12 Tray B-8, A0056
24 13 Tray B-8, A0056
24 14 Tray G-12,
24 15 Tray B-8, M0004
24 16 Tray B-8, A0147
24 17
24 18 Tray G-2
24 19
24 20 TRAY F-08, LOOSE FLAKE OF FILM, CORNER

25 1

26 1

27 1 LDEF, SHADOW OF LEFT THIRD COVER, BOTTOM TRAY
27 2 LDEF, SHADOW OF LEFT THIRD COVER, BOTTOM TRAY
27 3 LDEF, VARIOUS IMPACTS AND DEBRIS, TRAY
27 4 LDEF, SHADOW, UPPER LT OUTSIDE, TRAY
27 5 LDEF, SHADOW, UPPER LT OUTSIDE, TRAY
27 6 LDEF, 2 LIFTS, BACKSIDE OF TRAY
27 7 TRAY H-03, EXP. M0001,
27 8 TRAY H-03, EXP. M0001,
27 9 TRAY H-03, EXP. M0001,
27 10 3-19-90 SAEF-2, 1 LIFT, FLOOR IN FRONT OF RETURN AIR VENT
27 11 3-19-90 SAEF-2, 1 LIFT, SEAM OF PACKAGING CRATE AT AIRLOCK
27 12 3-19-90 SAEF-2, 4 LIFTS, STAIRS UP TO PLATFORM
27 13
27 14
27 15
27 16
27 17
27 18
27 19
27 20

28 1

29 1 4-14-90 LDEF, 1 LIFT, UNDER CLAMP C-03.4
29 2 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP C-03.4
29 3 4-14-90 LDEF, 4 LIFT, NEXT TO CLAMP C-03.4
29 4 4-14-90 LDEF, 4 LIFTS, LONG. 2-3 AT ROW C
29 5 4-14-90 LDEF, LIFT, LONG. 10-11 AT ROW F
29 6 4-14-90 LDEF, 1 LIFT, UNDER CLAMP D-10.4

29 7 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP D-10.4
29 8 4-14-90 LDEF, 4 LIFT, NEXT TO CLAMP D-10.4
29 9 4-14-90 LDEF, 1 LIFT, BLACK PAINT AFTER SWAB, D-10
29 10 4-14-90 LDEF, 1 LIFT, UNDER CLAMP F-06.6
29 11 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP F-06.6
29 12 4-14-90 LDEF, 1 LIFT, HOLE AND WASHER DEBRIS, CLAMP F-06.6
29 13 4-14-90 LDEF, 4 LIFT, NEXT TO CLAMP F-06.6
29 14 4-14-90 LDEF, 4 LIFT, NEXT TO CLAMP F-06.8, 2 IMPACTS
29 15 4-14-90 LDEF, 1 LIFT, UNDER CLAMP F-06.8
29 16 4-14-90 LDEF, 1 LIFT, UNDER CLAMP E-06.4
29 17 4-14-90 LDEF, 1 LIFT, BETWEEN E-06 AND F-06
29 18 4-14-90 LDEF, 1 LIFT, EAGLE HEAD PATTERN, LONG. 6-5, ROW E
29 19 4-14-90 LDEF, 1 LIFT, UNDER CLAMP B-05.4
29 20 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP B-05.4

30 1 4-14-19 LDEF, LONG. ROW B COL.4-5, SHADOW
30 2 4-14-19 LDEF, SPACE END CHANNEL AROUND CORNER FROM F-6
30C 3 4-14-19 LDEF, 4 LIFTS, SQUARE BETWEEN E-F AND 1-12
30 4 4-14-19 LDEF, C-09, UNDER SCREW HOLES
30 5 4-14-19 LDEF, C-03, UNDER SCREW HOLES
30 6 4-14-19 LDEF, C-03, 4 LIFTS, TRAY COVER
30C 7 4-14-19 LDEF, C-09, 4 LIFTS, TRAY COVER
30C 8 4-14-19 LDEF, INITIATOR BOX, 1 LIFT
30C 9 4-14-19 LDEF, INITIATOR BOX, 4 LIFTS
30 10 4-14-19 LDEF, BRACE BETWEEN B AND C 7, 1 LIFT, UNDER CLAMP
30C 11 4-14-19 LDEF, BRACE BETWEEN B AND C 7, 1 LIFT, EXPOSED
30C 12 4-14-19 LDEF, BRACE BETWEEN B AND C 7, 4 LIFT, EXPOSED
30 13 4-14-19 SAEF-2, TRAY ROTATOR, ORG WINCH BASE, RED BLOCK BELOW
30 14 4-14-19 SAEF-2, 4 LIFTS, TRAY ROTATOR CABLE
30C 15 4-14-19 LDEF, 4 LIFTS, INERTIAL CONTROL UNIT
30 16 4-14-19 LDEF, AROUND BOLT, G-03
30 17 4-14-19 LDEF, 1 LIFT, G-12, UNDER LOWER CENTER CLAMP
30 18 4-14-19 LDEF, 1 LIFT, G-12, EXPOSED

31C 1 3-27-90 LATS, 4 LIFTS,
31C 2 3-27-90 LATS, 4 LIFTS,
31C 3 3-27-90 LATS, 4 LIFTS,
31C 4 3-27-90 SAEF-2, 4 LIFTS,
31C 5 3-27-90 SAEF-2, 4 LIFTS,
31 6 3-29-90 SAEF-2, 4 LIFTS,
31 7 3-29-90 SAEF-2, 4 LIFTS,
31C 8 3-29-90 SAEF-2, 4 LIFTS,
31C 9 3-29-90 SAEF-2, 4 LIFTS,
31 10 3-29-90 SAEF-2, 4 LIFTS,
31 11 3-29-90 SAEF-2, 4 LIFTS,
31 12 3-29-90 SAEF-2, 4 LIFTS,
31 13 3-29-90 SAEF-2, 4 LIFTS,
31 14 3-29-90 SAEF-2, 4 LIFTS,
31 15 3-29-90 SAEF-2, 4 LIFTS,
31 16 3-29-90 SAEF-2, 4 LIFTS,
31 17 3-29-90 SAEF-2, 4 LIFTS,
31 18 3-29-90 SAEF-2, 4 LIFTS,
31 19 3-29-90 SAEF-2, 4 LIFTS,
31 20 3-29-90 SAEF-2, 4 LIFTS,

32 1 4-14-90 LDEF, 1 LIFT, UNDER CLAMP C-11.8
32 2 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP C-11.8
32 3 4-14-90 LDEF, 1 LIFT, UNDER CLAMP B-11.4
32 4 4-14-90 LDEF, 1 LIFT, UNDER CLAMP H-12.10
32 5 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP H-12.10
32 6 4-14-90 LDEF, 1 LIFT, CLAMP F-11, CORNER GRAB SAMPLE
32C 7 4-14-90 LDEF, 1 LIFT, INSIDE LONG. 11-12, ROW F
32 8 4-14-90 LDEF, 1 LIFT, UNDER CLAMP B-04.4
32 9 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP B-04.4

32 10 4-14-90 LDEF, 1 LIFT, UNDER CLAMP E-04.4
32 11 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP E-04.4
32C 12 4-14-90 LIFT FROM BLACK TAPE ON CRANE UMBRELLA
32C 13 4-14-90 LIFT FROM WHITE PART OF CRANE UMBRELLA
32 14 4-14-90 LDEF, 1 LIFT, UNDER CLAMP D-12.4
32 15 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP D-12.4
32 16 4-14-90 LDEF, 1 LIFT, UNDER CLAMP E-12.4
32C 17 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP E-12.4
32C 18 4-14-90 LDEF, 1 LIFT, UNDER CLAMP B-01.4
32C 19 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP B-01.4
32C 20 4-14-90 LDEF, 4 LIFT, NEXT TO CLAMP B-01.4

33 1 4-13-90 LDEF, 1 LIFT, UNDER CLAMP B-08.4
33 2 4-13-90 LDEF, 1 LIFT, NEXT TO CLAMP B-08.4
33C 3 4-13-90 LDEF, 4 LIFT, UNDER CLAMP B-08.4
33C 4 4-13-90 LDEF, 4 LIFT, NEXT TO CLAMP B-08.4
33 5 4-13-90 LDEF, 1 LIFT, UNDER CLAMP H-07.5, WASHER AND BOLT HOLE
33 6 4-13-90 LDEF, 1 LIFT, UNDER CLAMP A-08.4
33 7 4-13-90 LDEF, 1 LIFT, NEXT TO CLAMP A-08.4
33 8 4-13-90 LDEF, 1 LIFT, UNDER CLAMP A-08.6
33 9 4-13-90 LDEF, 4 LIFT, NEXT TO CLAMP A-08.6, 2 IMPACTS
33 10 4-13-90 LDEF, 1 LIFT, UNDER CLAMP F-08.4
33 11 4-13-90 LDEF, 1 LIFT, NEXT TO CLAMP F-08.4, 1 IMPACT
33C 12 4-13-90 LDEF, 4 LIFT, NEXT TO CLAMP B-09.6
33 13 4-13-90 LDEF, 1 LIFT, UNDER CLAMP D-09.4
33 14 4-13-90 LDEF, 1 LIFT, NEXT TO CLAMP D-09.4
33C 15 4-13-90 LDEF, 1 LIFT, UNDER CLAMP F-02.8
33 16 4-13-90 LDEF, 1 LIFT, NEXT TO CLAMP F-02.8
33 17 4-13-90 LDEF, 1 LIFT, UNDER CLAMP F-02.4
33 18 4-13-90 LDEF, 1 LIFT, NEXT TO CLAMP F-02.4
33 19 4-13-90 LDEF, 1 LIFT, UNDER CLAMP E-02.4

34

35 1 SAEF-2, BLACK SOLE OF CLEAN ROOM BOOT
35 2 SAEF-2, FLOOR SAMPLE AFTER CLEANING
35 3 SAEF-2, SOLE OF BOOT AFTER ALCOHOL WIPEDOWN
35 4 BROKEN
35 5 LDEF, 1 LIFT, TRAY H-01 FRONT CENTER OFF GODDARD GRN
35 6 LDEF, 1 LIFT, DISCOLORATION OF H-01 TCC, H-01/H-12 EDGE
35 7 LDEF, 1 LIFT, DISCOLORATION OF H-01 TCC, H-01/H-12 EDGE
35 8 LDEF, 1 LIFT, H-01 TCC NOT DISCOLORED
35 9 LDEF, 1 LIFT, RESIDUE INSIDE LONG. 1-12, ROW A
35 10 LDEF, 1 LIFT, RESIDUE INSIDE LONG. 1-12, ROW A
35 11 LDEF, 1 LIFT, UPPER LEFT INTERCOSTAL, F-03
35 12 LDEF, 1 LIFT, UPPER RIGHT INTERCOSTAL, F-03
35 13 LDEF, 1 LIFT, BLACK RESIDUE UNDER FASTENER, H-05
35 14 LDEF, 1 LIFT, EARTH END OF LONG. 4-5
35 15 LDEF, 1 LIFT, FRAME EDGE OF G-06
35 16 LDEF, 1 LIFT, SPACE END OF LONG. 7-8
35 17 LDEF, 1 LIFT, EARTH END STRUT COL.7, ROW A/B
35 18 SAEF-2, 4 LIFTS, MSIG BENCH NEAR INTAKE VENTS
35 19 SAEF-2, 4 LIFTS, FLOOR NEAR MSIG BENCH
35 20 SAEF-2, 4 LIFTS, FLOOR NEAR AIRLOCK

36 NOT USED

37 NOT USED

38	10
38	11
38	12
38	13
38	14

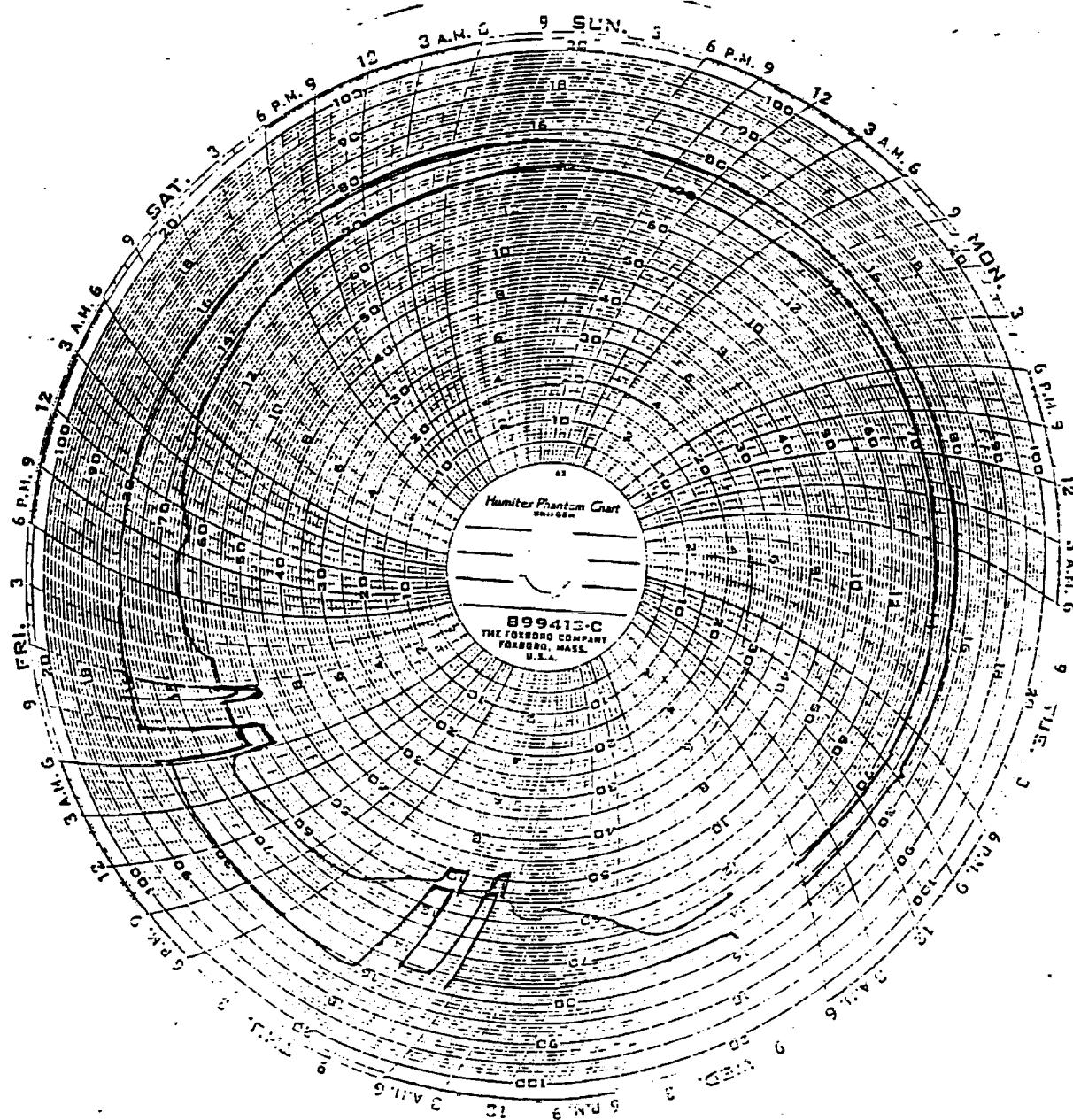
APPENDIX 3

ENVIRONMENTAL MONITORING DATA FROM KENNEDY SPACE CENTER FOR LDEF

The following data is arranged in sets by parameter measured. Within each set the data is arranged by date. The sets are in the following order:

1. PARTICLE FALLOUT DISTRIBUTION
2. AUTOMATIC PARTICLE COUNT DATA FOR SAEF-II
3. RELATIVE HUMIDITY VS TIME FOR SAEF-II
4. TEMPERATURE VS TIME FOR SAEF-II

Below is the record of the relative humidity for the OPF.

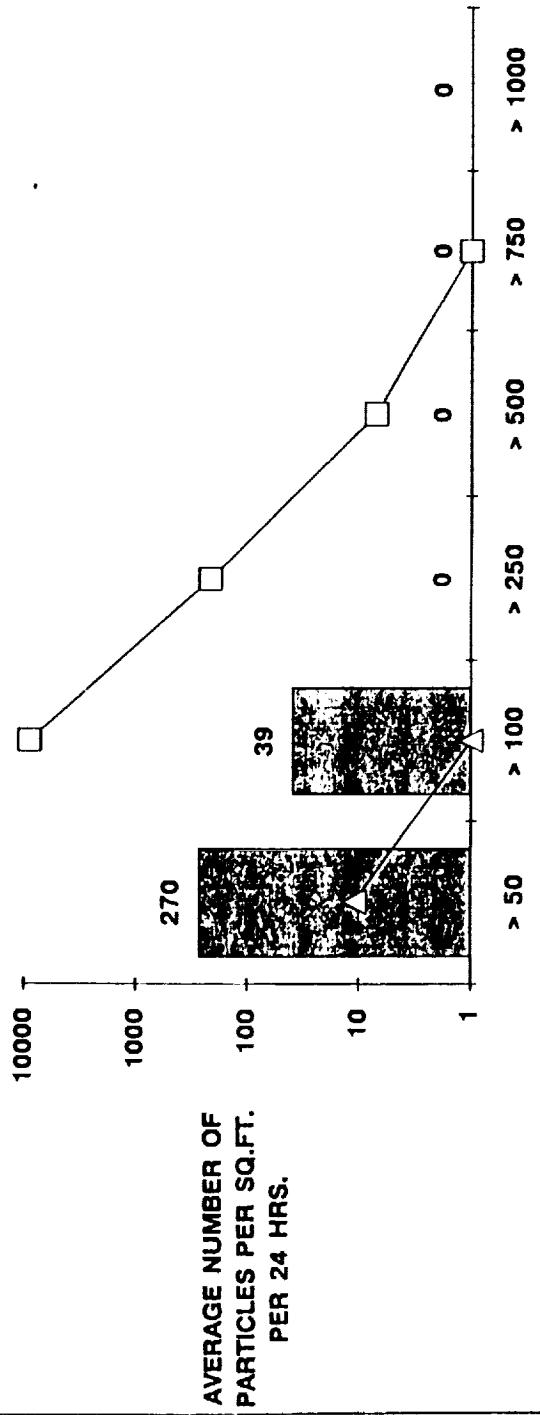


PARTICLE FALLOUT DISTRIBUTION

CANISTER I STS 32R (LDEF)

January 1990

- PARTICLES
- 750 Level
- 100 Level



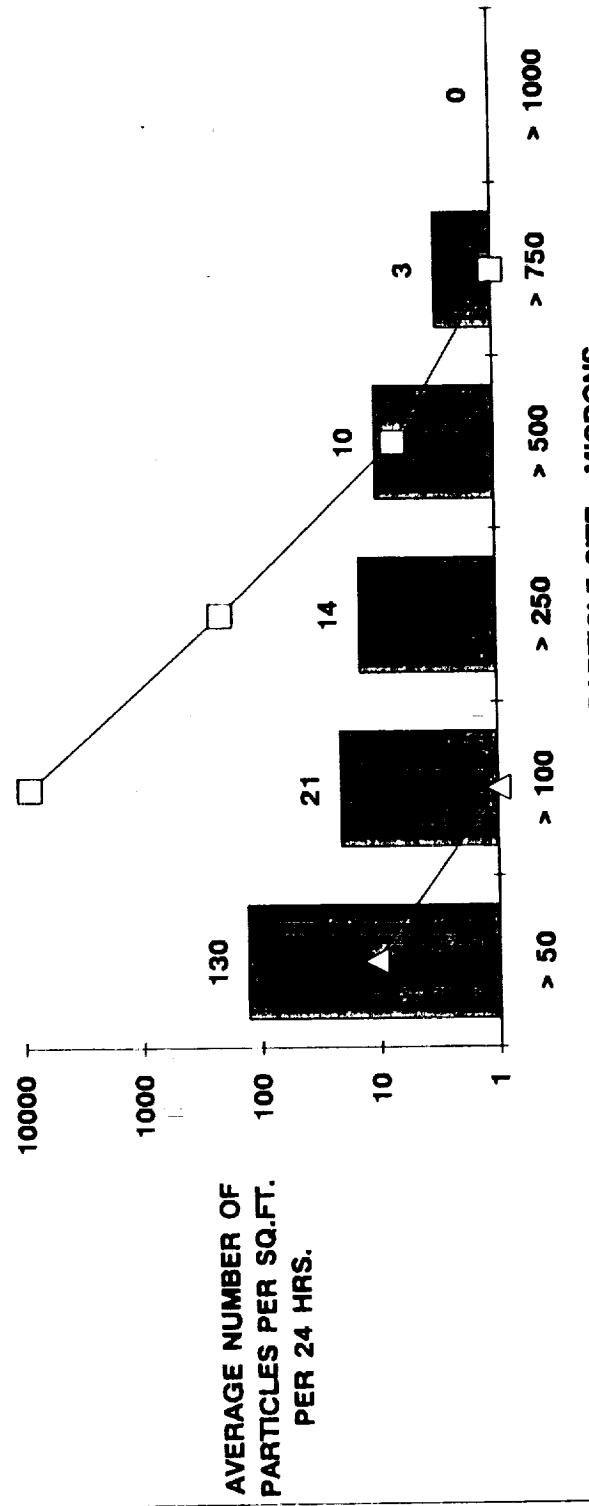
*Fibers

PARTICLE FALLOUT DISTRIBUTION

LATS STS 32R (LDEF)

February 1990

PRE/POST TRANSPORTATION (O&C to SAEF-2)



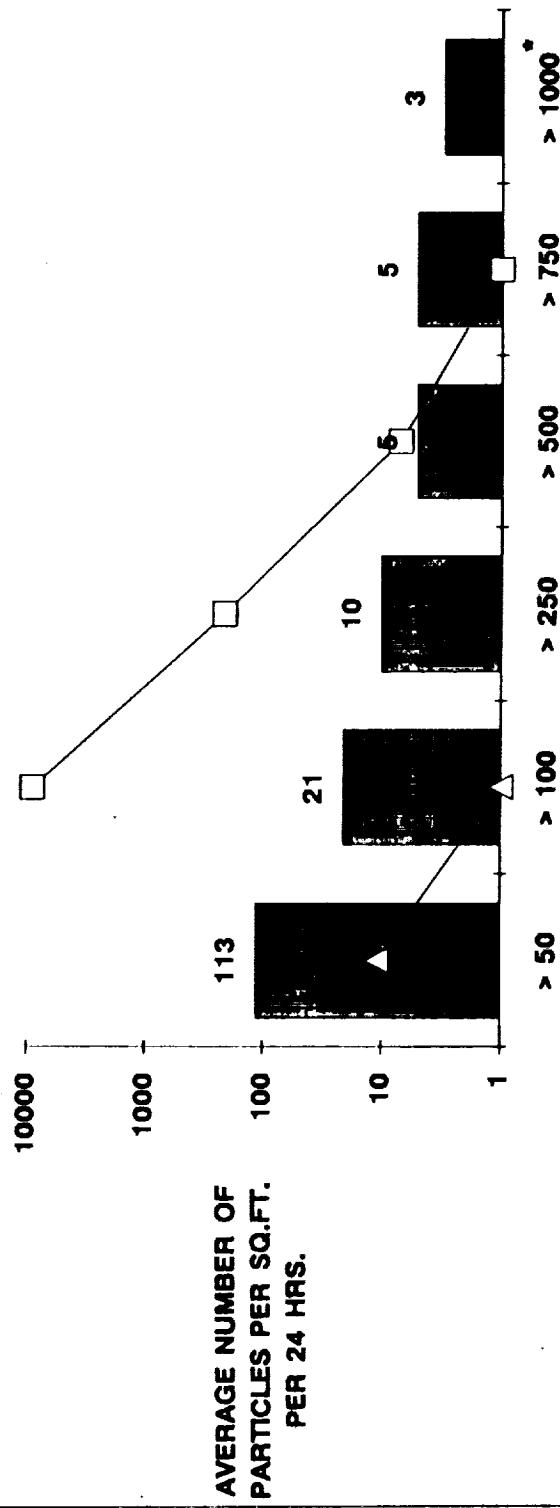
*Fibers

Note: 100 & 750 Cleanliness Levels per MIL-STD-1246

PARTICLE FALLOUT DISTRIBUTION

LATS @ SAEF-2 STS 32R (LDEF)
February 1990

- PARTICLES
- 750 Level
- △ 100 Level



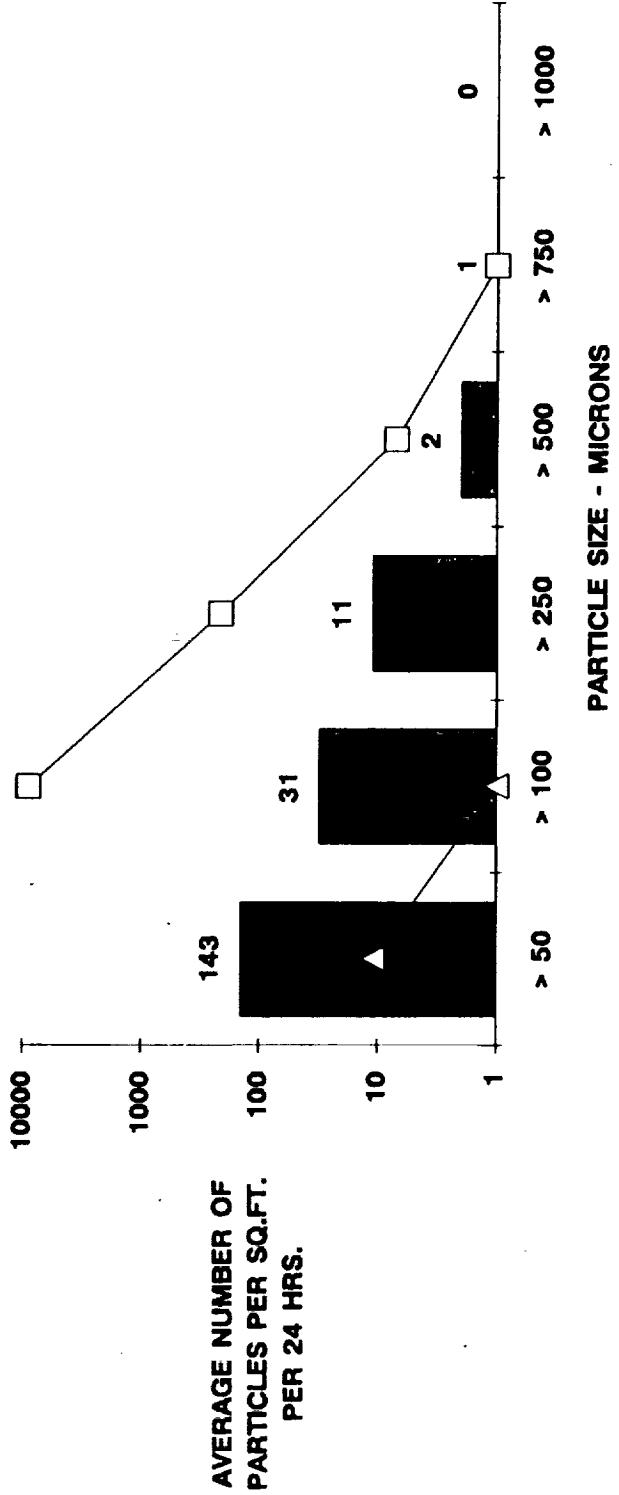
*Fibers

Note: 100 & 750 Cleanliness Levels per MIL-STD-1246

PARTICLE FALLOUT DISTRIBUTION

LATS @ SAEF-2 STS 32R (LDEF)

March 1990

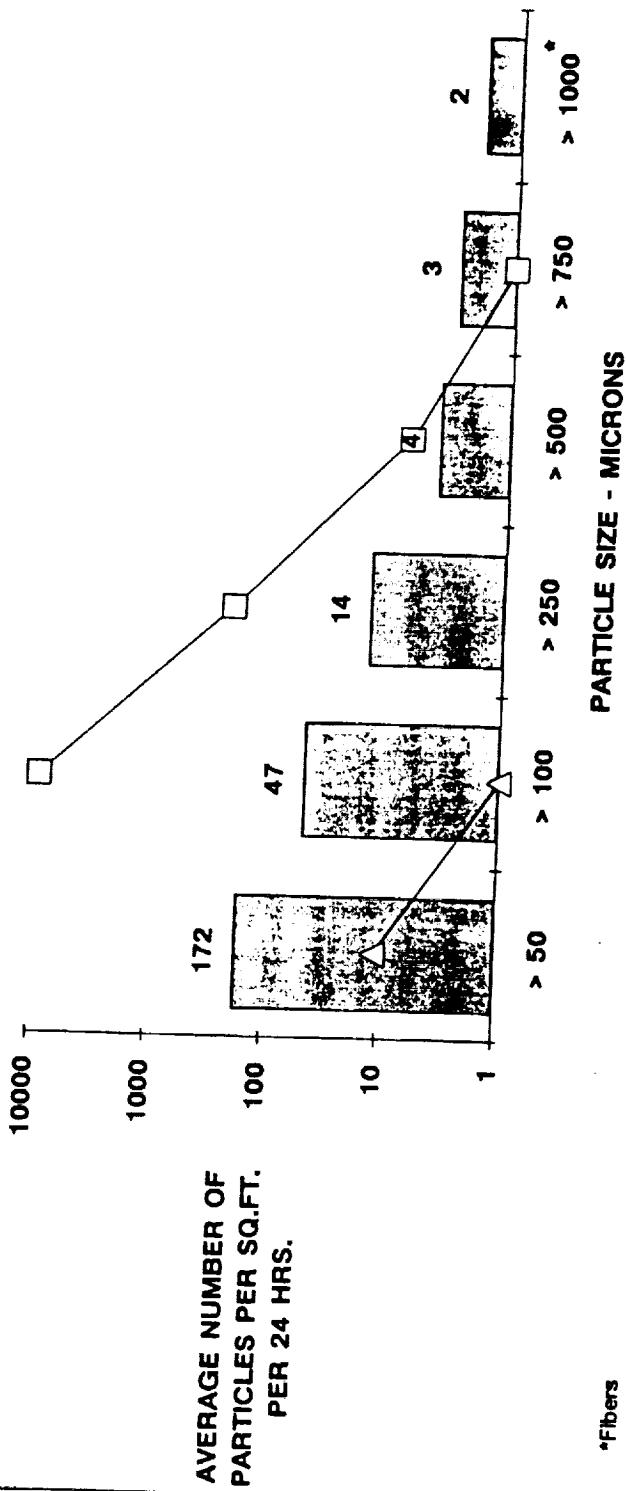


Note: 100 & 750 Cleanliness Levels per MIL-STD-1246

PARTICLE FALLOUT DISTRIBUTION

LATS @ SAEF-2 STS 32R (LDEF)
April 1990

- PARTICLES
- 750 Level
- △ 100 Level



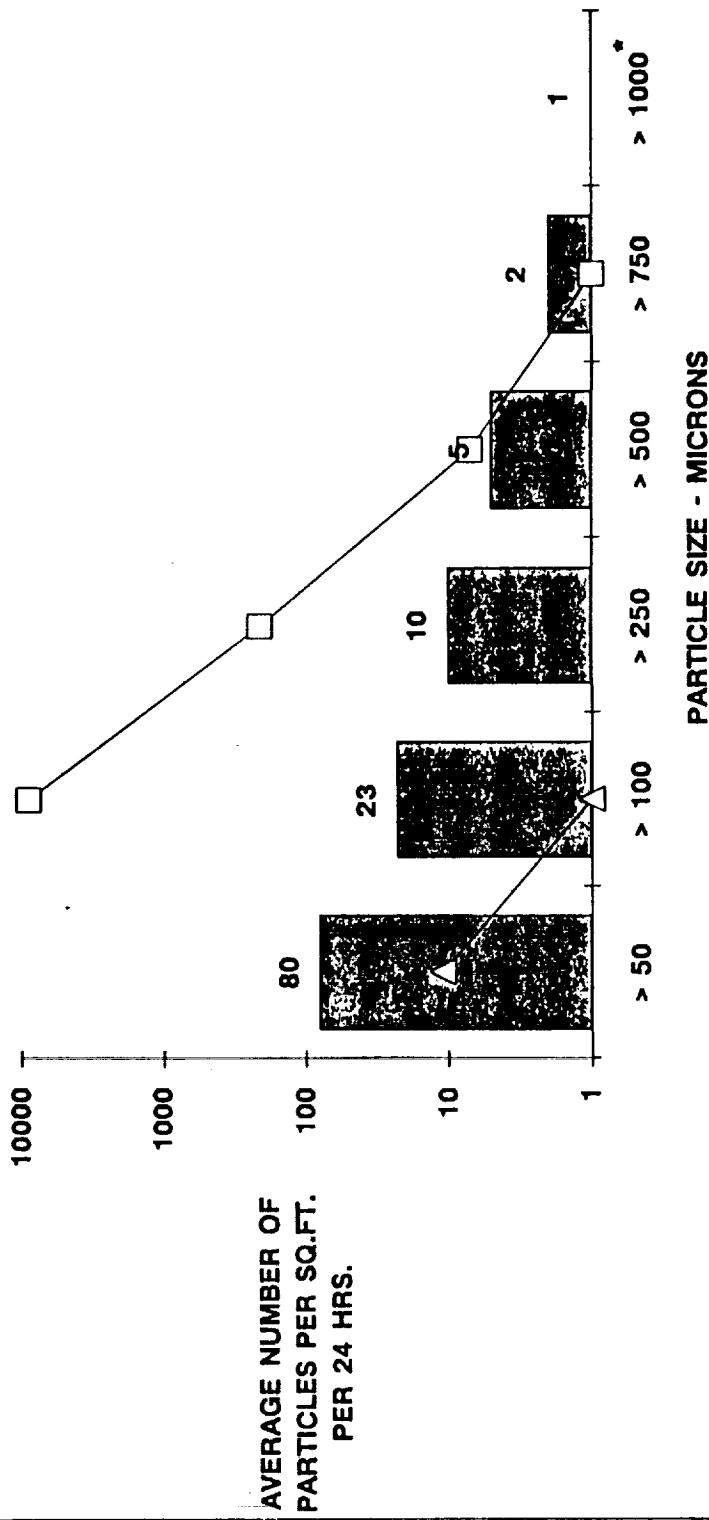
Note: 100 & 750 Cleanliness Levels per MIL-STD-1246

PARTICLE SIZE - MICRONS

*Fibers

PARTICLE FALLOUT DISTRIBUTION

SAEF II
December 1989

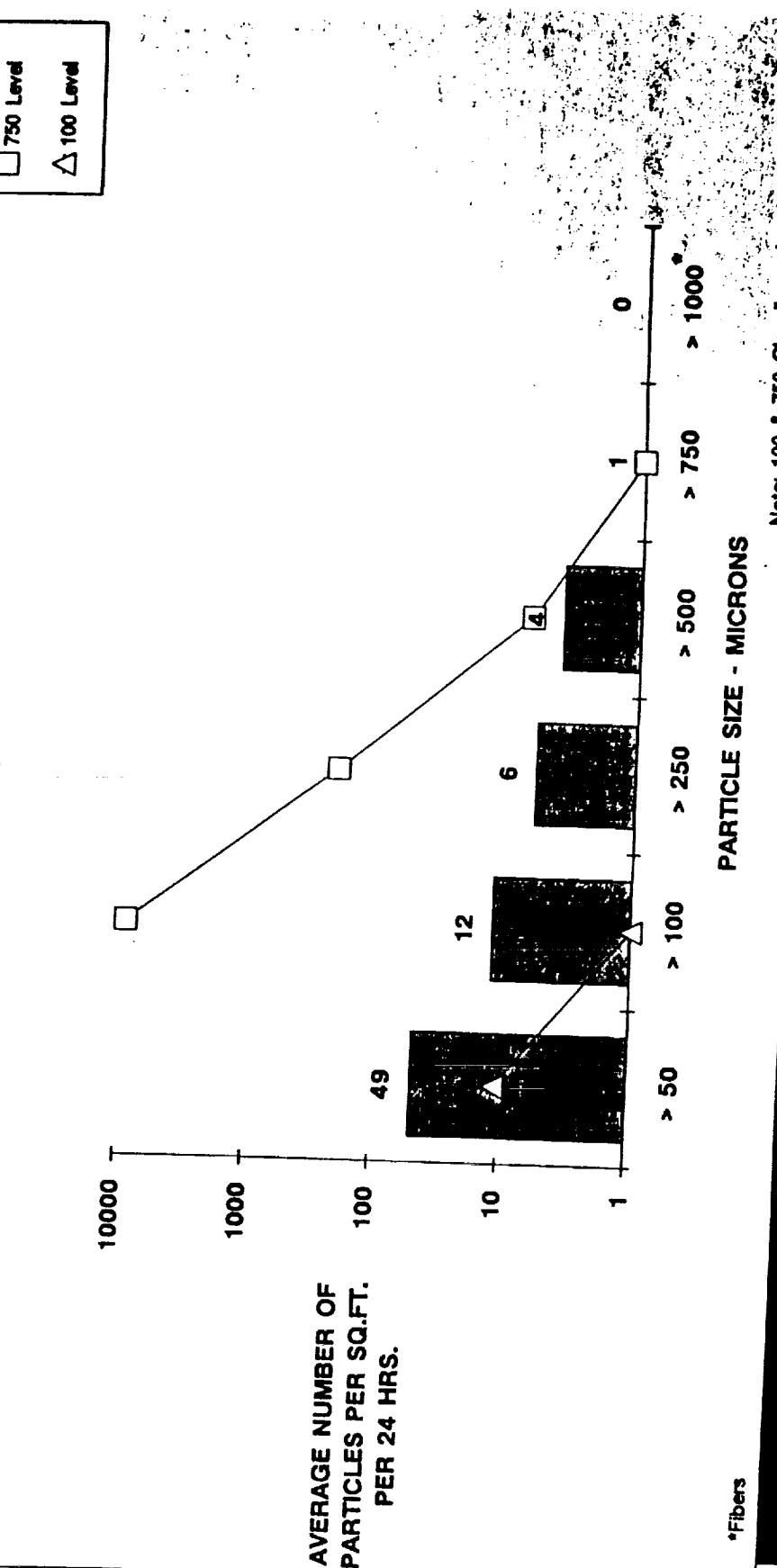


*Fibers

Note: 100 & 750 Cleanliness Levels per MIL-STD-1246

PARTICLE FALLOUT DISTRIBUTION

SAEF II
January 1990

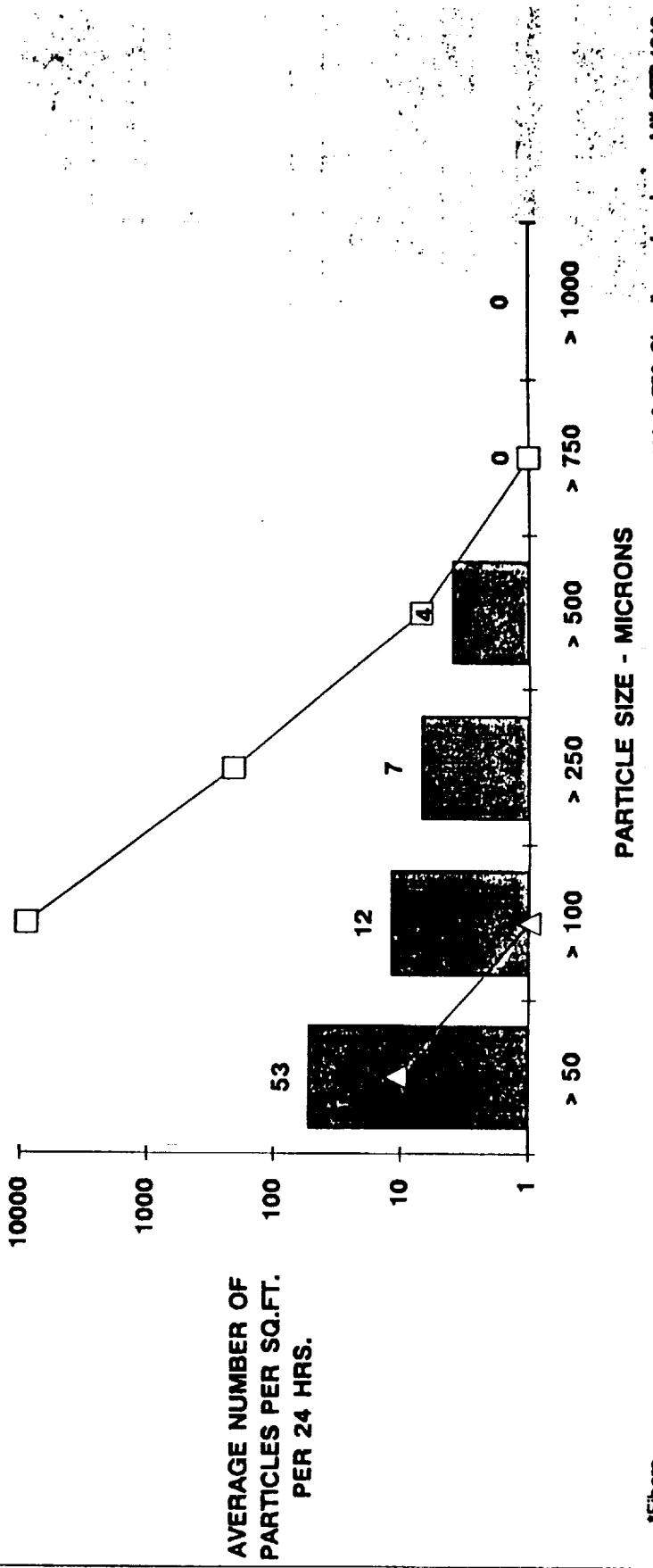


Note: 100 & 750 Cleanliness Levels per MIL-STD-1246

*Fibers

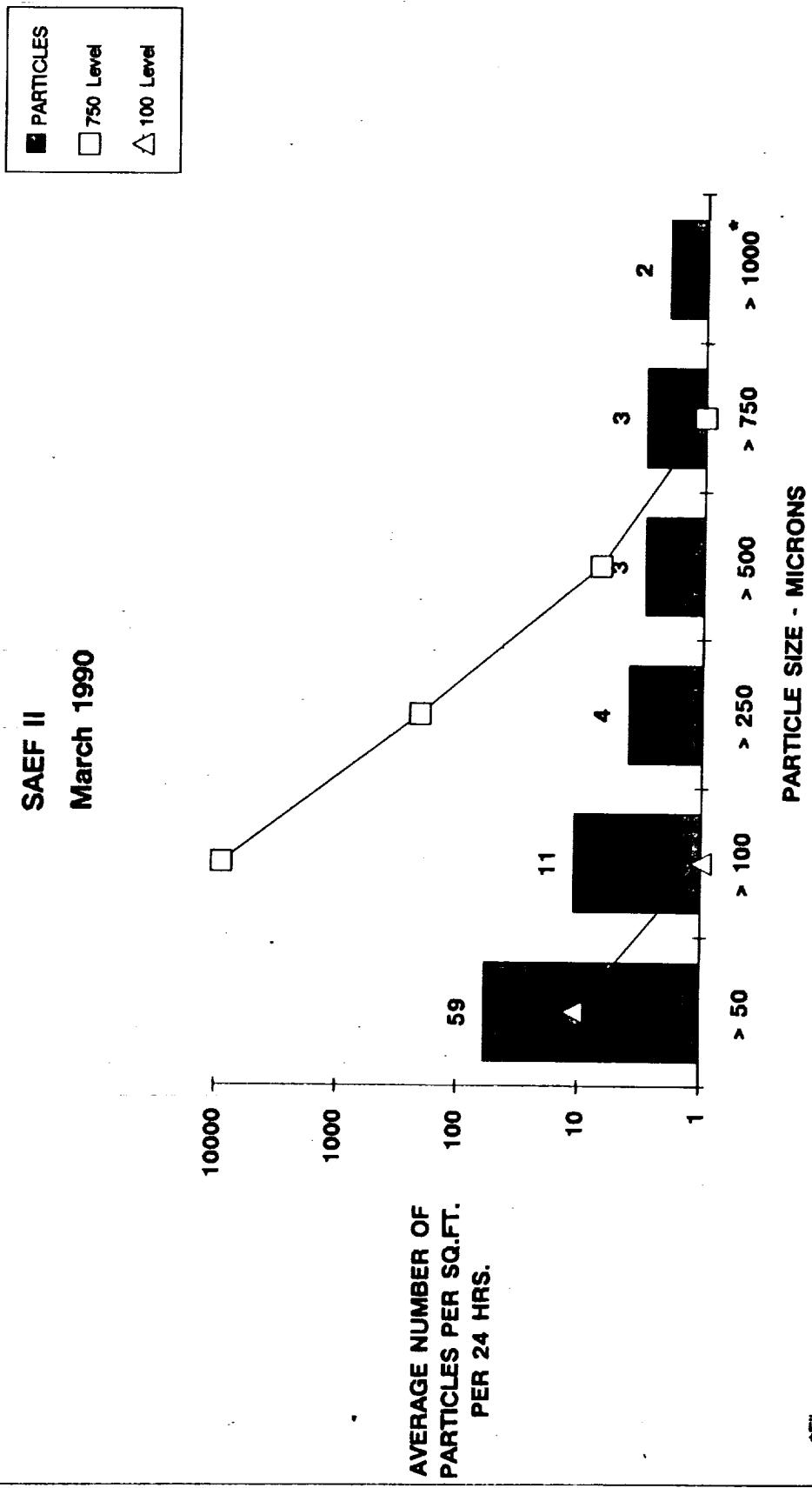
PARTICLE FALLOUT DISTRIBUTION

SAEF II
February 1990



PARTICLE FALLOUT DISTRIBUTION

SAEF II
March 1990



*Fibers

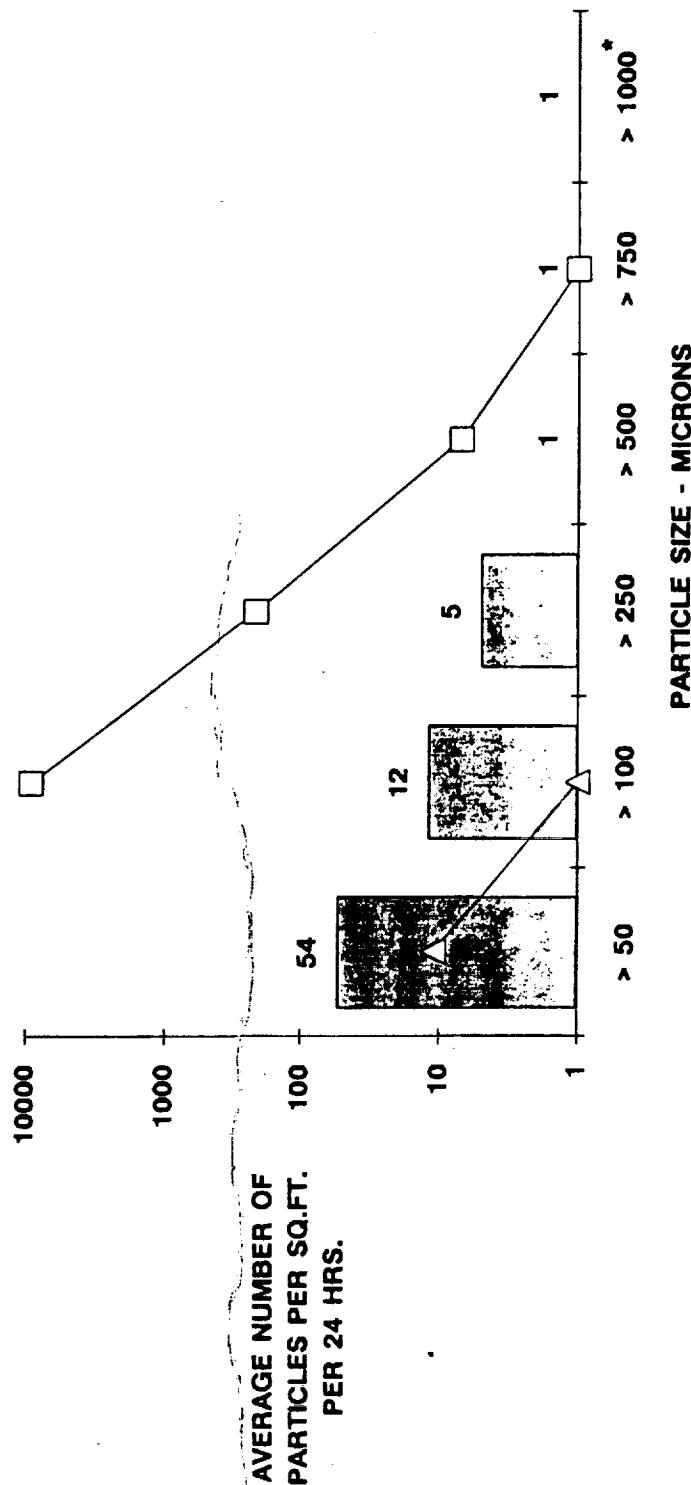
Note: 100 & 750 Cleanliness Levels per MIL-STD-1246

PARTICLE FALLOUT DISTRIBUTION

SAEF II

April 1990

- PARTICLES
- 750 Level
- 100 Level

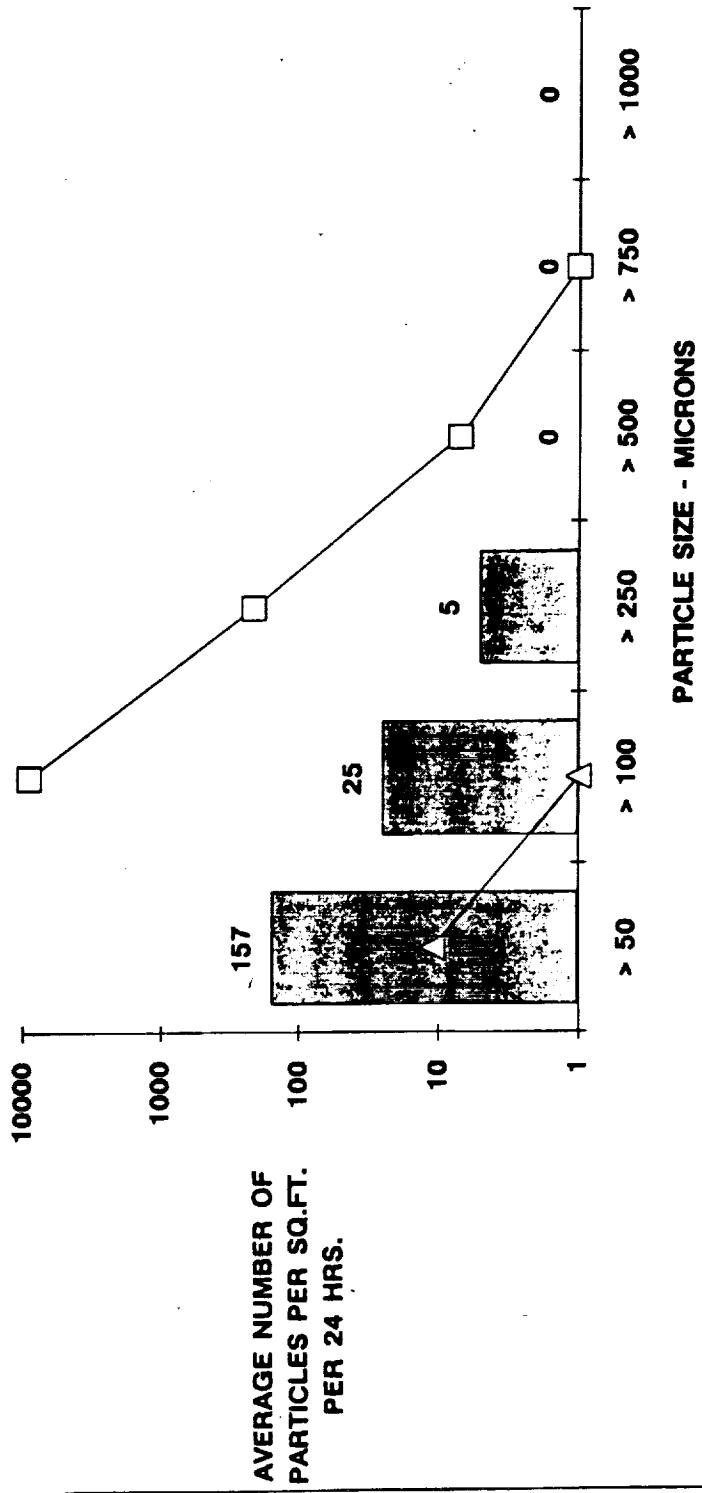


*Fibers

PARTICLE FALLOUT DISTRIBUTION

SAEF II
May 1990

- PARTICLES
- 750 Level
- △ 100 Level



Note: 100 & 750 Cleanliness Levels per MIL-STD-1246

NVR DATA
PRE/POST TRANSPORTATION (O&C to SAEF-2)

FACILITY: LATIS
MISSION: STS 32R (LDEF)

MONTH OF January 1990

SITE	START DATE	END DATE	LABORATORY WORK ORDER NUMBER	MG. PER 01 SQ. M PER MONTH
FWD-STB	02/01/90	02/06/90	G90-0150	0.28
MID-STB	02/01/90	02/06/90	G90-0151	0.28
AFT-STB	02/01/90	02/06/90	G90-0152	0.28
AFT-PORT	02/01/90	02/06/90	G90-0153	0.28
MID-PORT	02/01/90	02/06/90	G90-0154	0.28
FWD-PORT	02/01/90	02/06/90	G90-0155	0.28
FWD-STB	02/06/90	02/13/90	G90-01	0.20
AFT-STB	02/06/90	02/13/90	G90-01	0.20
AFT-PORT	02/06/90	02/13/90	G90-01	0.20
FWD-PORT	02/06/90	02/13/90	G90-01	0.20
FWD-STB	02/13/90	02/27/90	G90-02	0.10
AFT-STB	02/13/90	02/27/90	G90-02	0.10
AFT-PORT	02/13/90	02/27/90	G90-02	0.10
FWD-PORT	02/13/90	02/27/90	G90-02	0.10
				AVERAGE 0.21
				KCI-HB-5340.1
				Revision A

NVR DATA

FACILITY: CANISTER I
MISSION: STS 32R (IDEF)

MONTH OF January 1990

KCI-HB-5340.1
Revision A

PRE/POST TRANSPORTATION (O&C to SAEF-2) NVR DATA

FACILITY: LATS MONTH OF February 1990
MISSION: STS 32R (LDEE)

KCI-HB-5340.1 Revision A

FACILITY: LATS @ SAEF-2
MISSION: STS 32R (LDEEF)

MONTH OF February 1990

KCI-HB-5340.1
Revision A

NVR DATA

FACILITY: LATS @ SAEF-2
 MISSION: STS 32R (LDEF)

MONTH OF March 1990

SITE #	START DATE	END DATE	LABORATORY WORK ORDER NUMBER	MG. PER 0.1 SQ. M PER MONTH
FWD-STB	02/21/90	03/06/90	G90-0290	0.11
	03/06/90	03/20/90	G90-0392	0.32
AFT-STB	02/21/90	03/06/90	G90-0291	0.11
	03/06/90	03/20/90	G90-0393	0.10
AFT-PORT	02/21/90	03/06/90	G90-0292	0.11
	03/06/90	03/20/90	G90-0394	0.26
FWD-PORT	02/21/90	03/06/90	G90-0293	0.11
	03/06/90	03/20/90	G90-0395	0.30
				AVERAGE
				0.18

KCI-HB-5340.1
 Revision A

NVR DATA

FACILITY: LATS @ SAEF-2
 MISSION: SIS 32R (LDEF)

MONTH OF April 1990

SITE	START DATE	END DATE	LABORATORY WORK ORDER NUMBER	MC PER 0.1 SQ. M PER MONTH
FWD-STB	03/20/90	04/03/90	G90-0503	0.10
	04/03/90	04/18/90	G90-0576	0.09
AFT-STB	04/18/90	05/03/90	G90-0646	0.19
	03/20/90	04/03/90	G90-0504	0.10
AFT-PORT	04/03/90	04/18/90	G90-0577	0.09
	04/18/90	05/03/90	G90-0647	0.09
FWD-PORT	03/20/90	04/03/90	G90-0505	0.10
	04/03/90	04/18/90	G90-0578	0.09
	04/18/90	05/03/90	G90-0648	0.11
	03/20/90	04/03/90	G90-0506	0.10
	04/03/90	04/18/90	G90-0579	0.11
	04/18/90	05/03/90	G90-0649	0.09
				AVERAGE 0.11

FACILITY: SAEF II

MONTH OF December 1989

KCI-HB-5340.1
Revision A

FACILITY: SAEF II

MONTH OF January 1990

SITE #	START DATE	END DATE	LABORATORY WORK ORDER NUMBER	MG. PER 0.1 SQ. M PER MONTH
EAST WALL	12/19/89	01/02/90	G89-1600	0.28
	01/02/90	01/16/90	G89-1698	0.16
	01/16/90	01/30/90	G90-0014	0.10
WEST WALL	12/19/89	01/02/90	G89-1599	0.32
	01/02/90	01/16/90	G89-1699	0.14
	01/16/90	01/30/90	G90-0015	0.12
NORTH WALL	12/19/89	01/02/90	G89-1598	0.26
	01/02/90	01/16/90	G89-1700	0.18
	01/16/90	01/30/90	G90-0016	0.20
				AVERAGE
				0.20

KCI-HB-5340.1
Revision A

NVR DATA

FACILITY: SAEF II

MONTH OF April 1990

FACILITY: SAEF II

MONTH OF March 1990

SITE #	START DATE	END DATE	LABORATORY WORK ORDER NUMBER	MC PER SQ FT PER MONTH
EAST WALL	02/27/90	03/09/90	G90-0320	0.22
	03/09/90	03/27/90	G90-0431	0.09
WEST WALL	02/27/90	03/09/90	G90-0321	0.22
	03/09/90	03/27/90	G90-0432	0.16
NORTH WALL	02/27/90	03/09/90	G90-0322	0.25
	03/09/90	03/27/90	G90-0433	0.08
				AVERAGE 0.17

KCI-HB-5340.1
Revision A

FACILITY: SAEF II

MONTH OF April 1990

FACILITY: SAEF II

MONTH OF May 1990

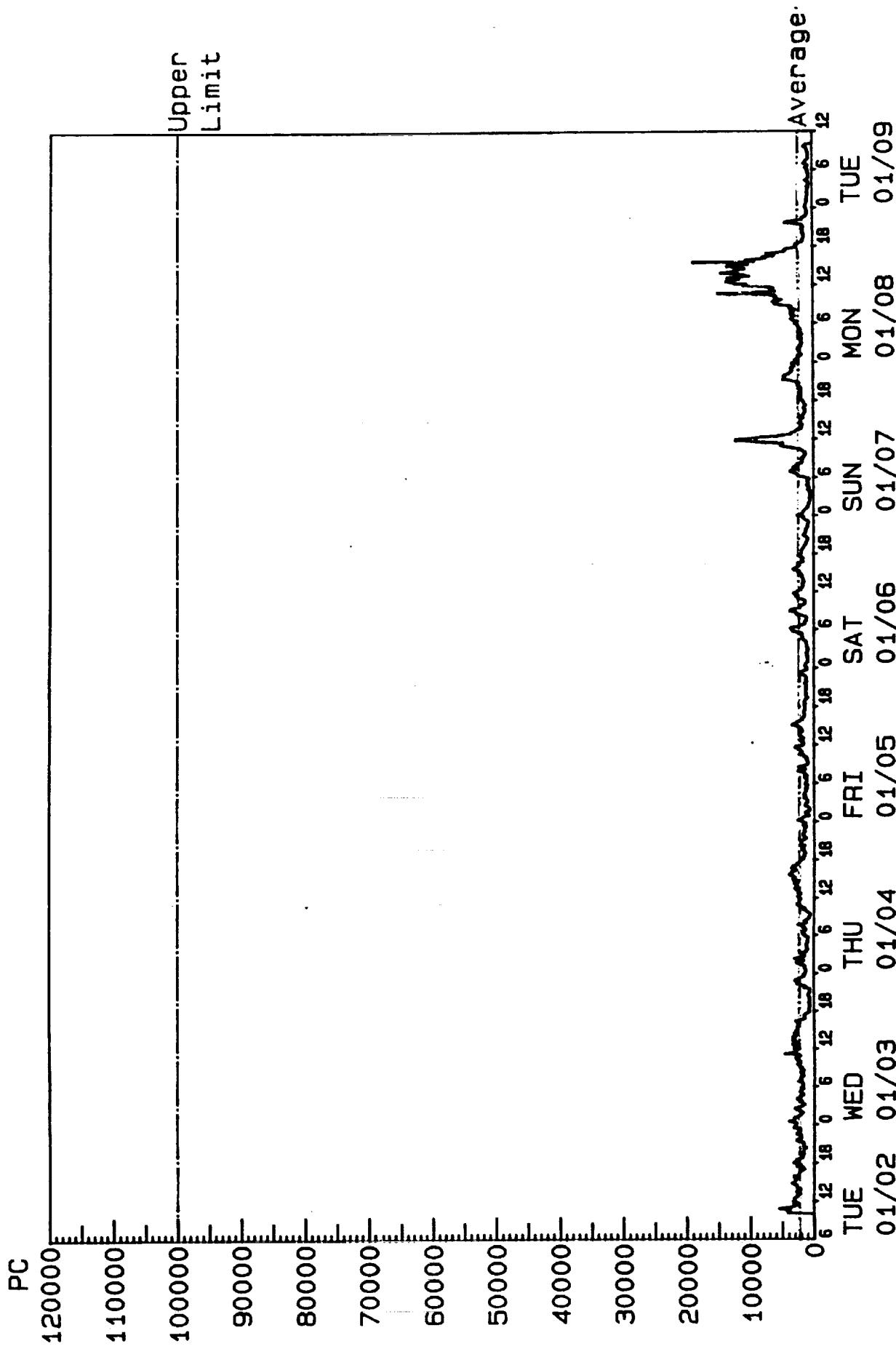
SITE #	START DATE	END DATE	LABORATORY WORK ORDER NUMBER	MG PER 0.150 M PER MONTH
EAST WALL	04/24/90	05/08/90	G90-0669	0.18
WEST WALL	04/24/90	05/08/90	G90-0670	0.26
NORTH WALL	04/24/90	05/08/90	G90-0671	0.10
				AVERAGE 0.18

0.5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C01)

Upper
Limit

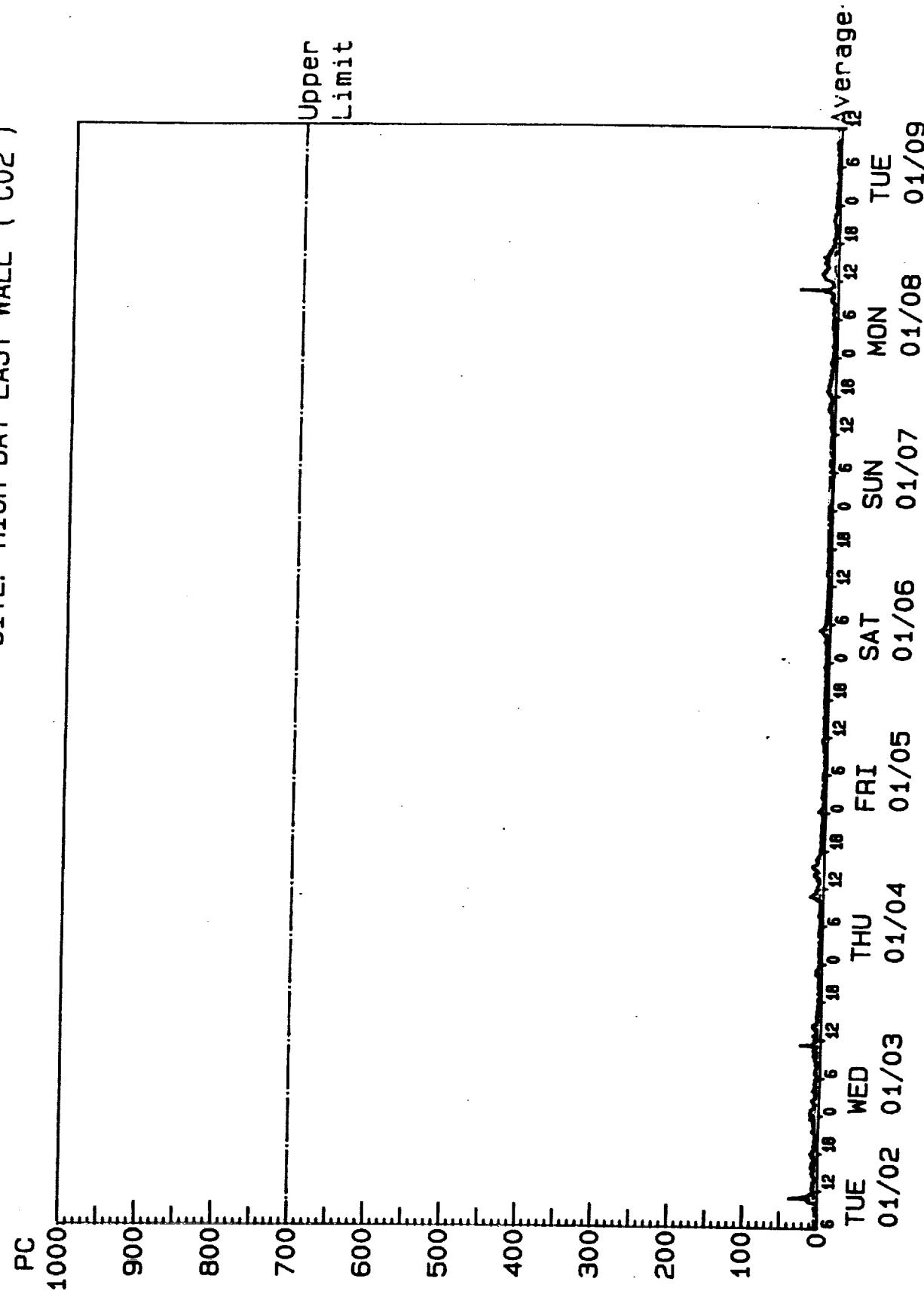


ה. ו. נ. אוניברסיטת תל אביב / גדרון קבוצתית

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C02)

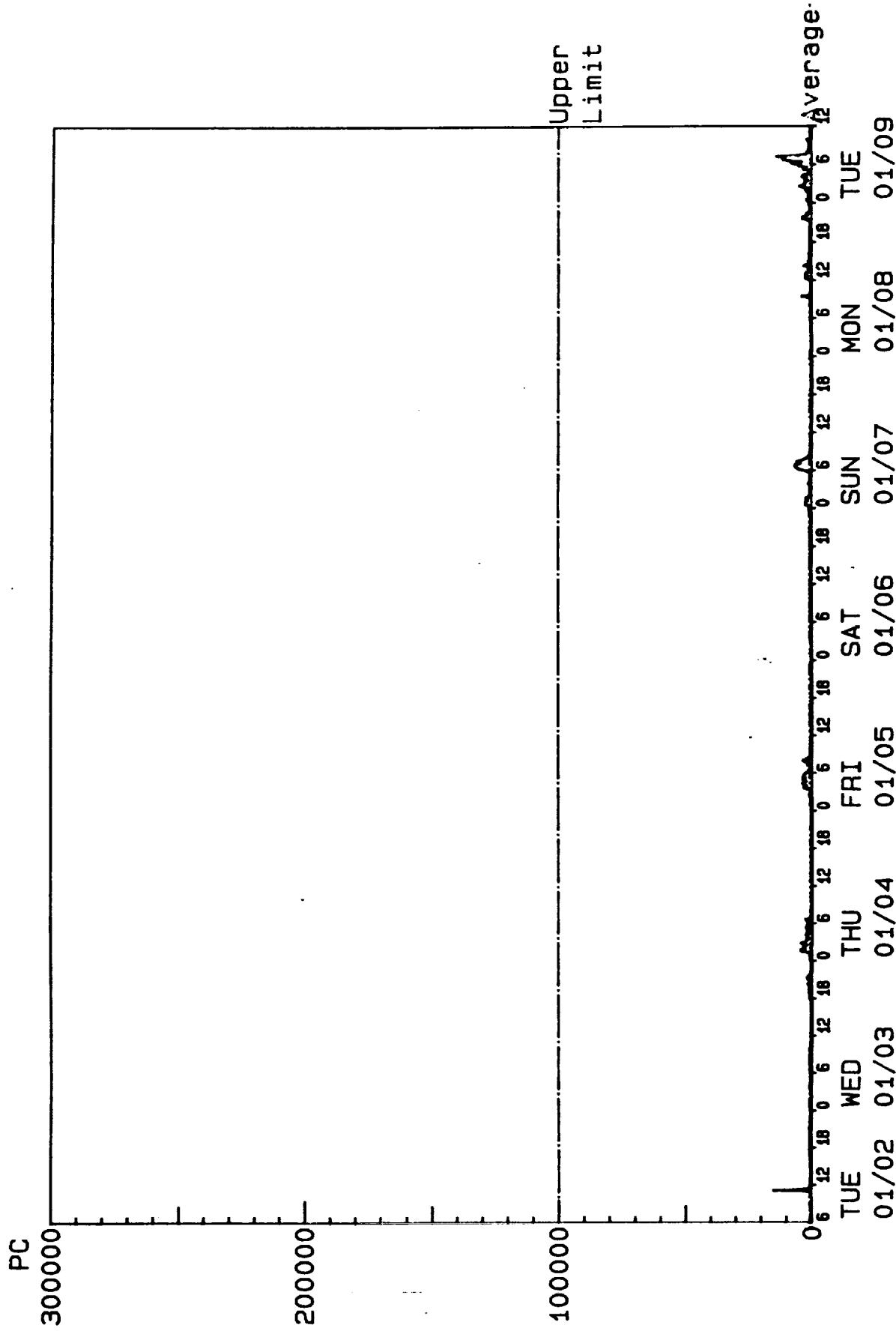
Upper
Limit



0.5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

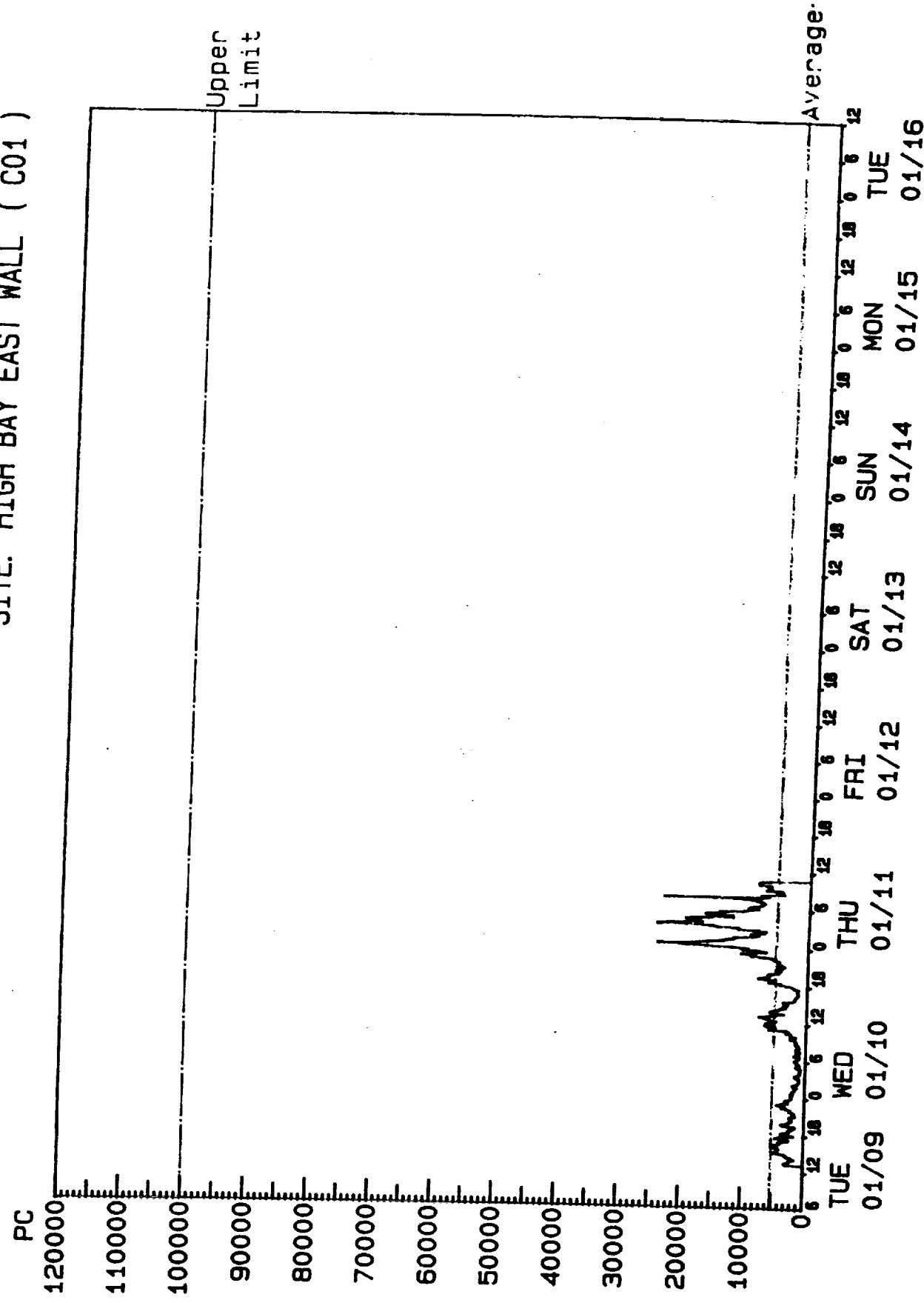
SITE: AIRLOCK EAST WALL (C05)



0.5 MICRON PARTICLES / CUBIC FT

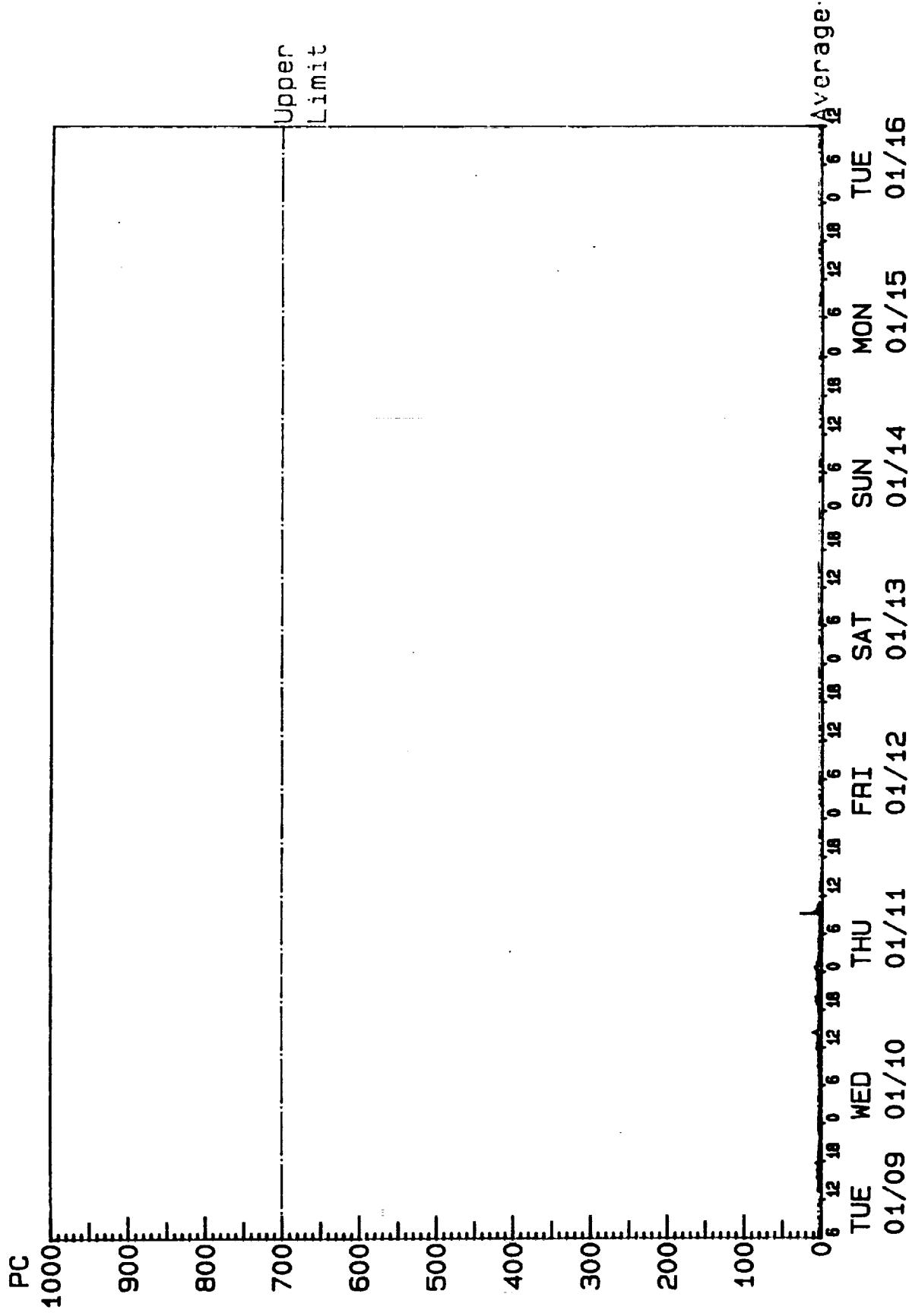
FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C01)



5.0 MICRON PARTICLES / CUBIC FT

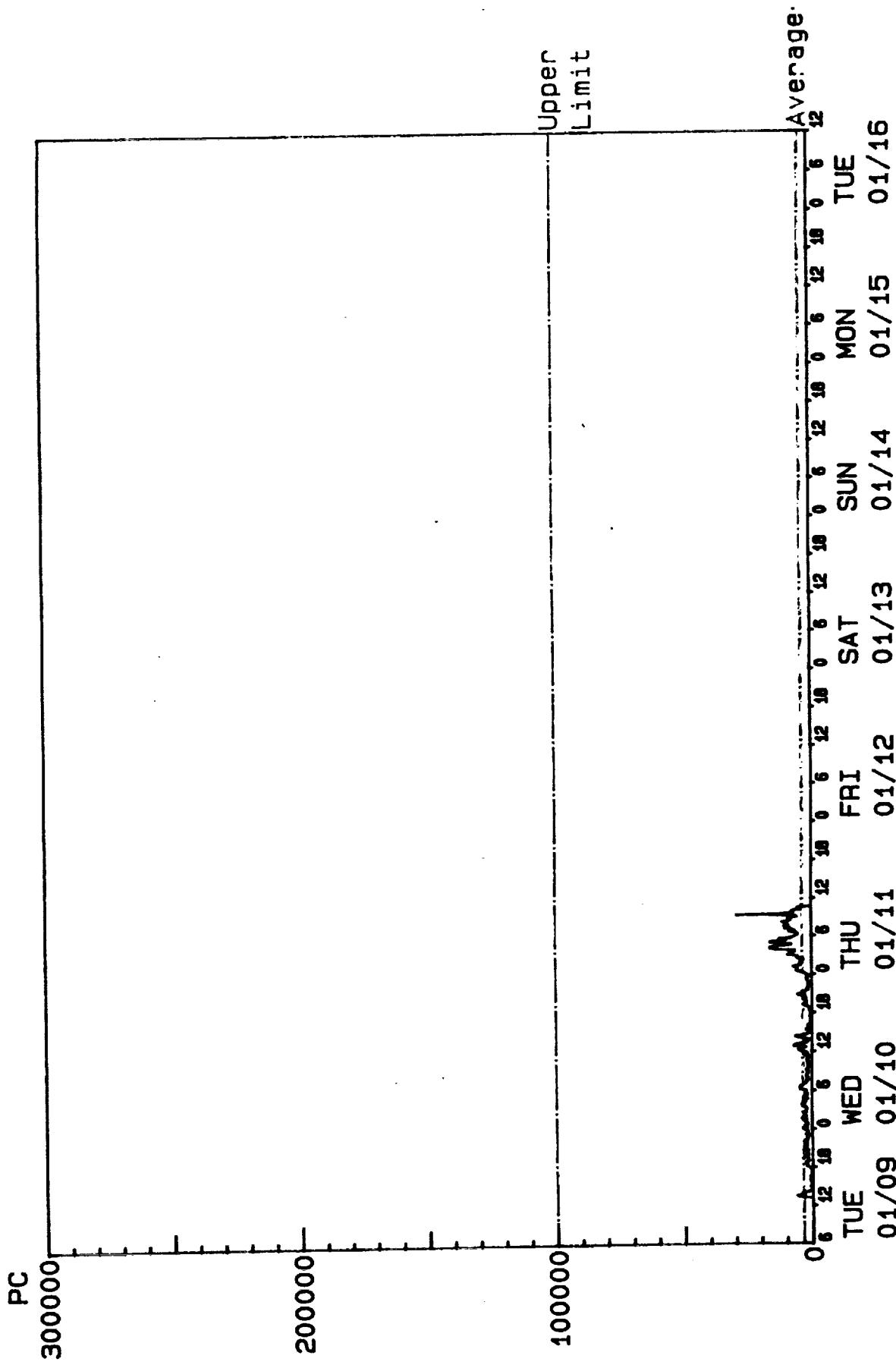
FACILITY: SAEF II SITE: HIGH BAY EAST WALL (CO2)



0.5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

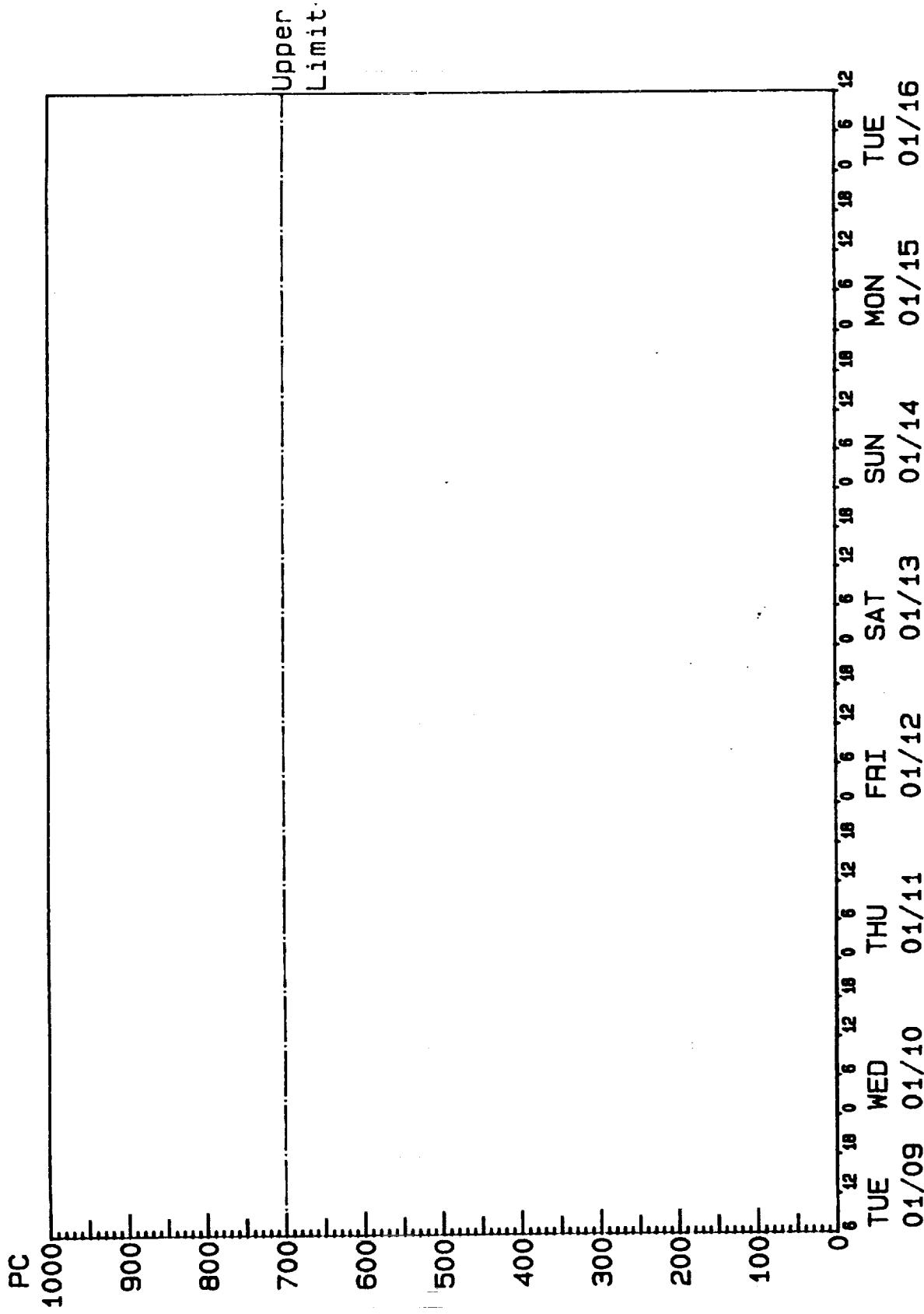
SITE: AIRLOCK EAST WALL (C05)



5.0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

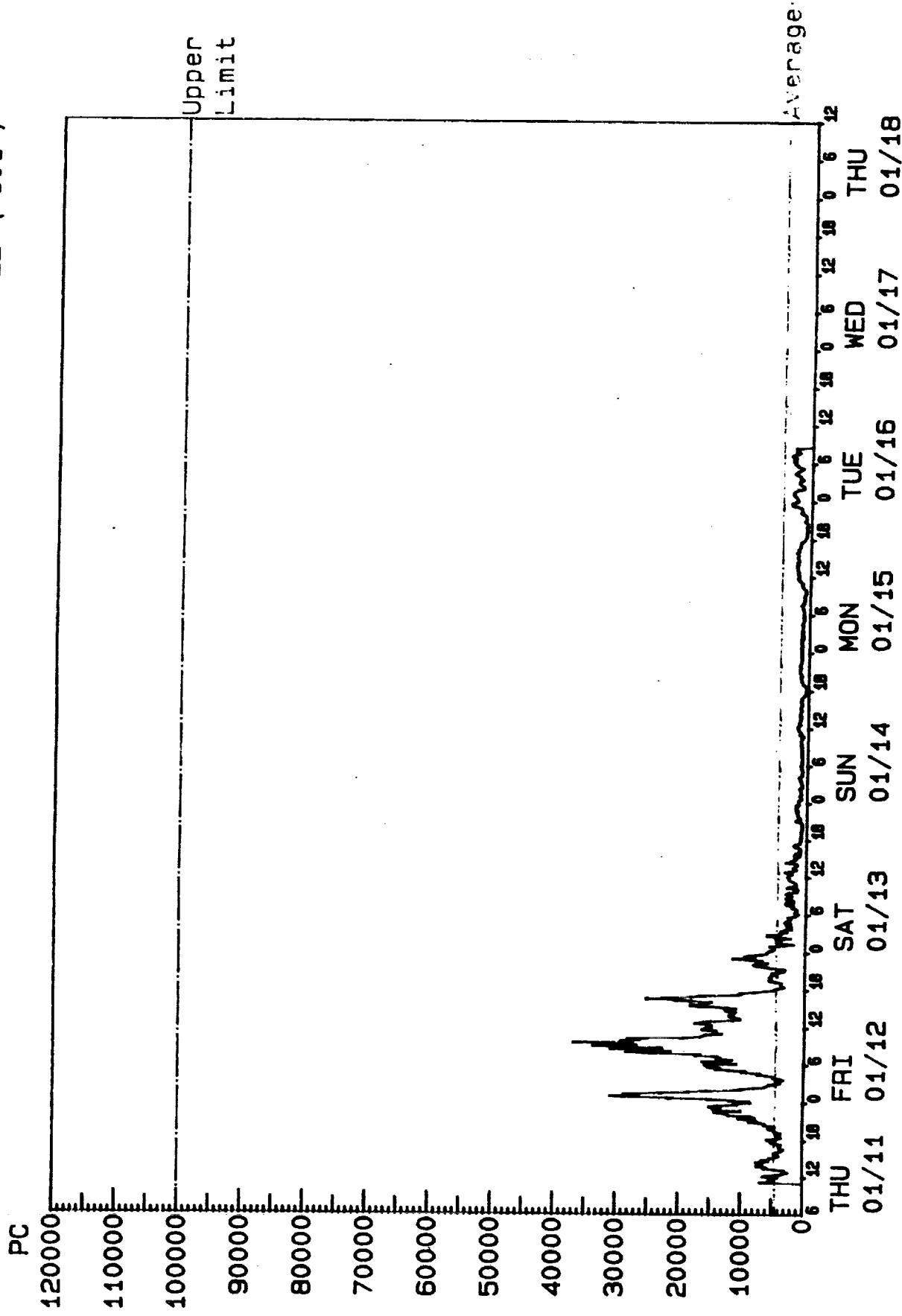
SITE: AIRLOCK EAST WALL (C06)



0.5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C01)



5.0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (CO2)

PC

1000

900

800

700

600

500

400

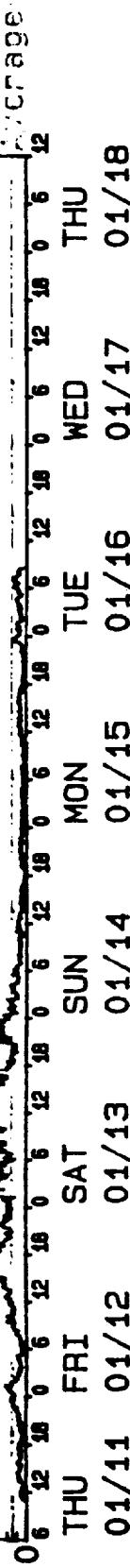
300

200

100

0

Upper
Limit



FACILITY: SAEF II

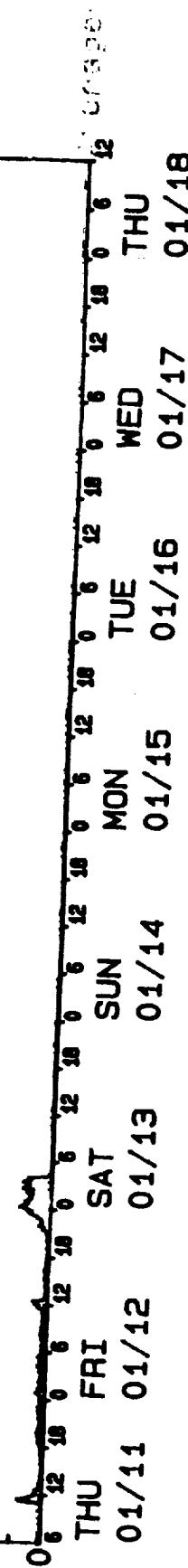
SITE: AIRLOCK EAST WALL (C05)

PC
3000000

2000000

1000000

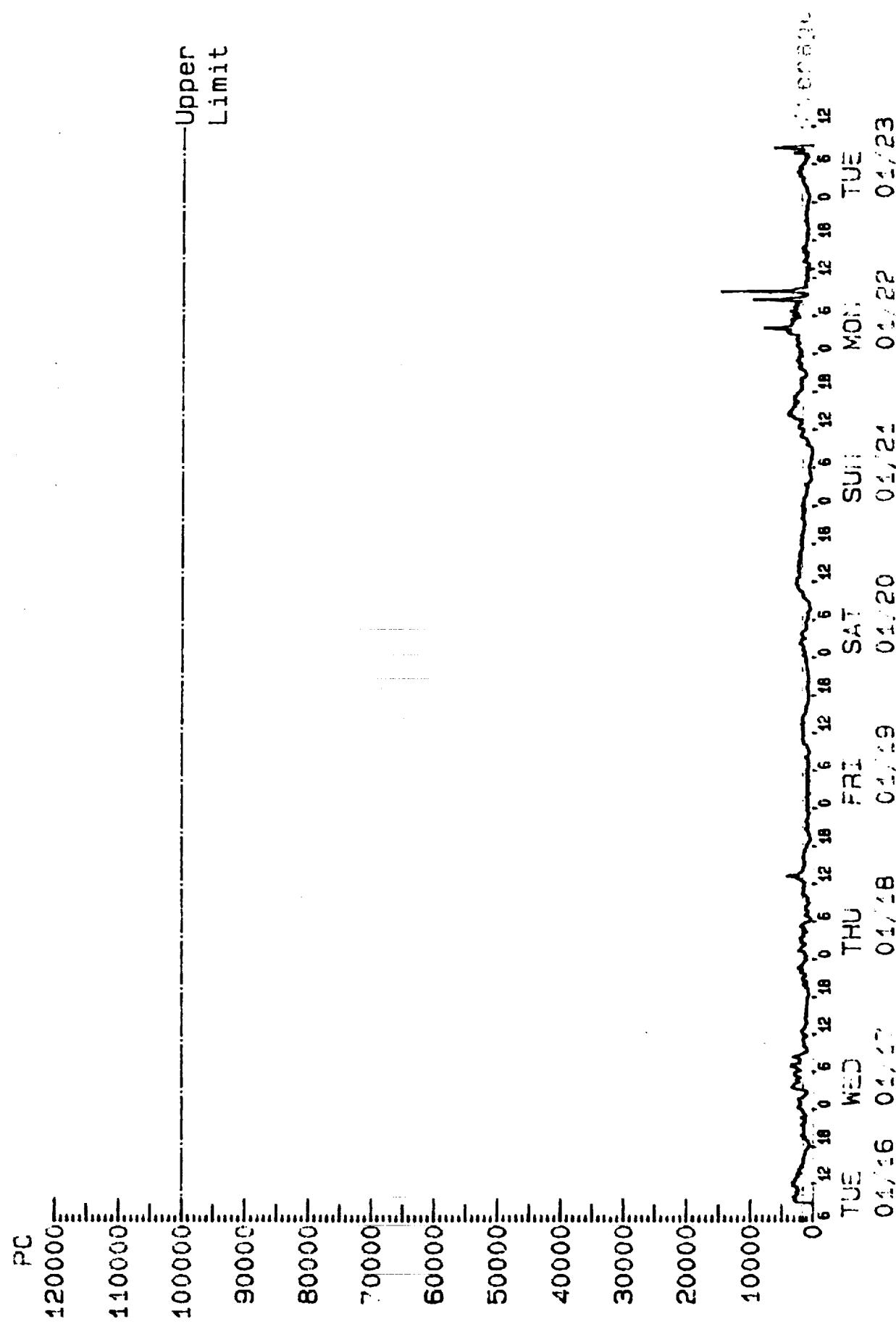
Upper
Limit



0.5 MICRON PARTICLES / CUBIC FT

FACTORY SITE

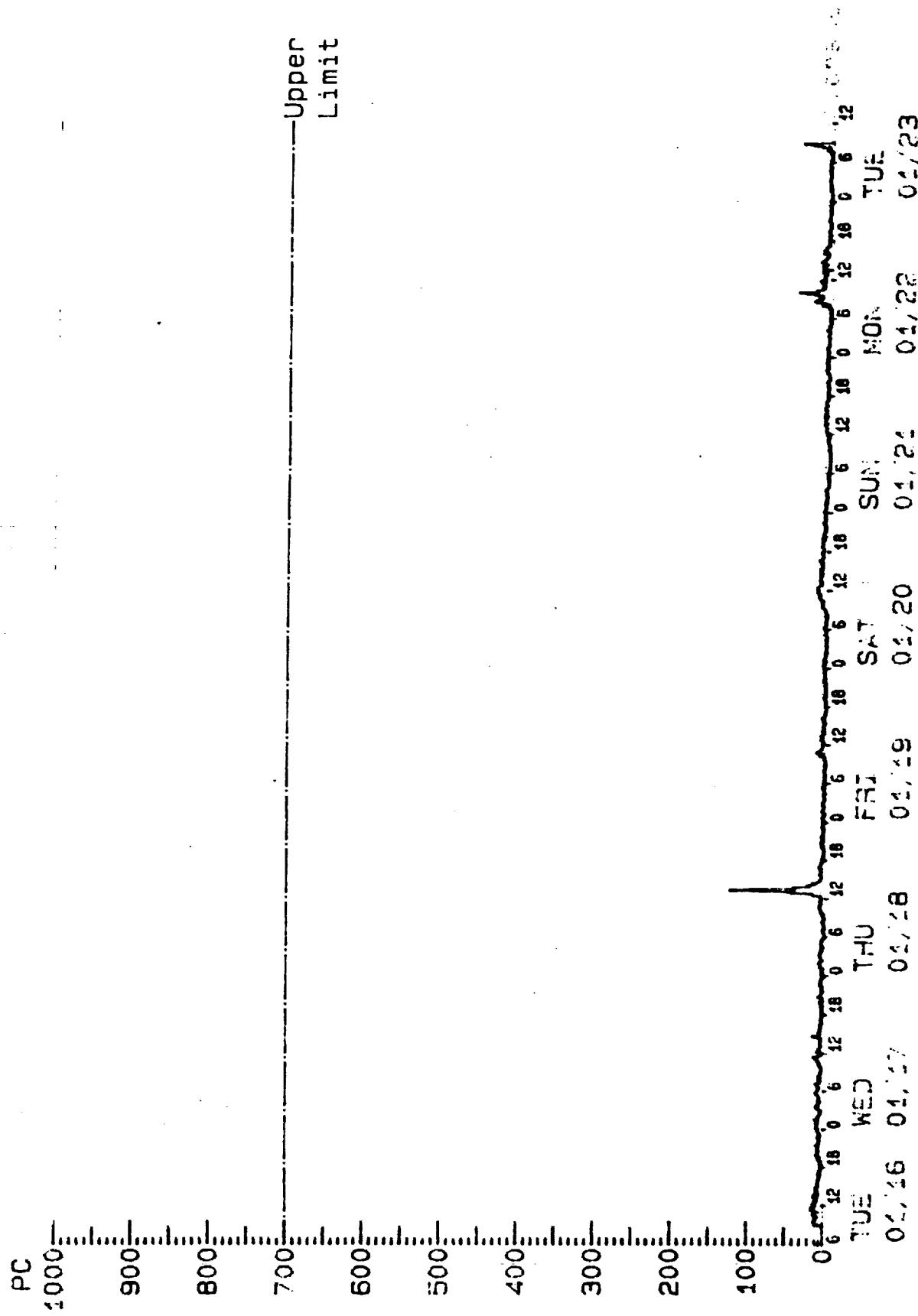
SITE: HIGH BAY EAST WALL (CO4)



5.0 MICRON PARTICLES / CUBIC FT.

卷之三

SIZE: HIGH BAY EAST WALL (CC2)



0.5 MICRON PARTICLES , CUBIC FT

FACILITY: SAEF II

SITE: AREA EAST (005)

PC

300000--

200000--

100000--

Upper
Limit

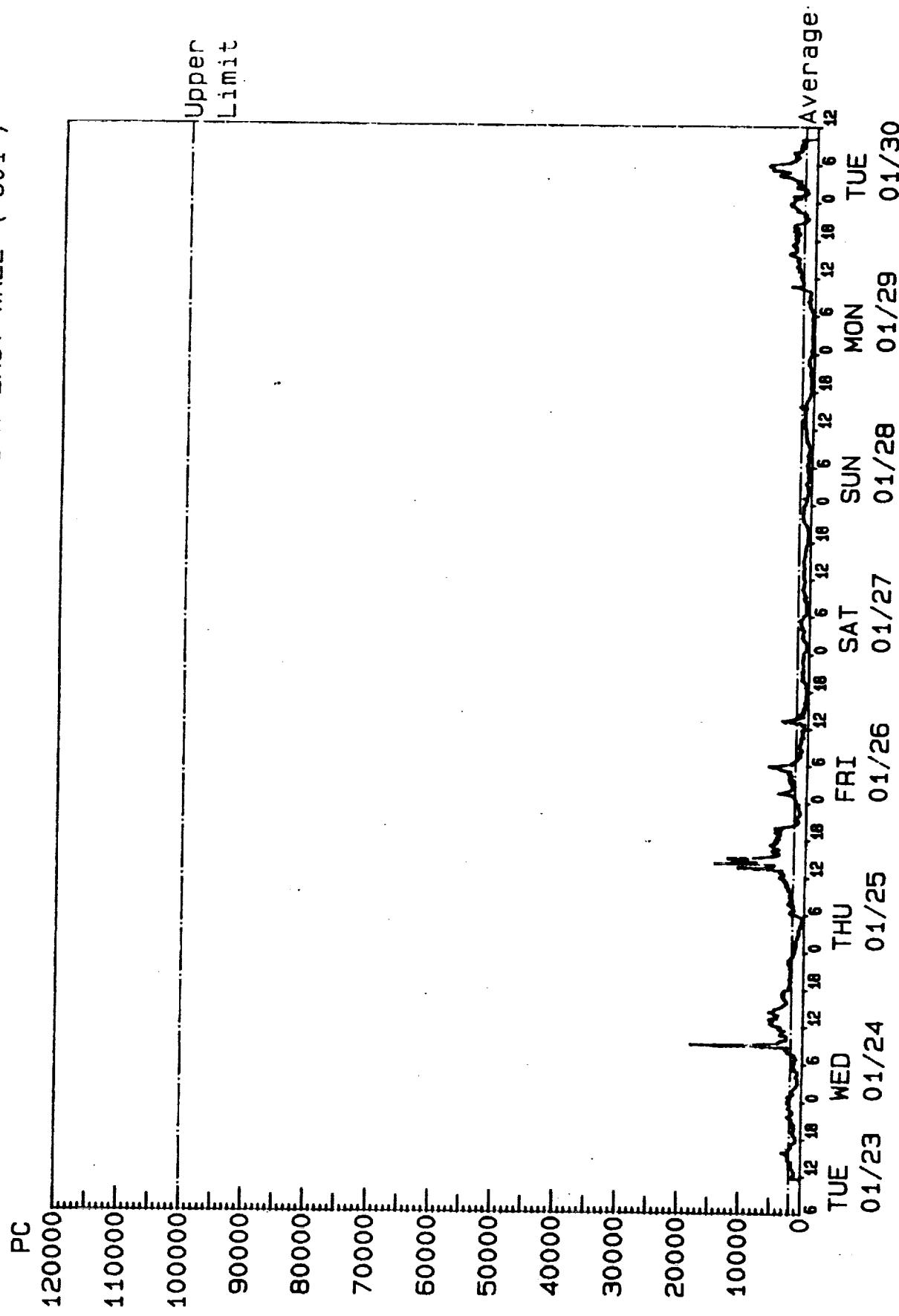
06	12	18	06	12	18	06	12	18	06	12	18	06	12	18	06	12	18	06	12	18	06	12	TUE	WED	THU	FRI	SAT	SUN	MON	TUE								
01/16	01/17	01/18	01/19	01/20	01/21	01/22	01/23	01/24	01/25	01/26	01/27	01/28	01/29	01/30	01/31	01/01	01/02	01/03	01/04	01/05	01/06	01/07	01/08	01/09	01/10	01/11	01/12	01/13	01/14	01/15	01/16	01/17	01/18	01/19	01/20	01/21	01/22	01/23

U.5 MICHUN PARTICLES / CUBIC FT

FACILITY: SAEF II

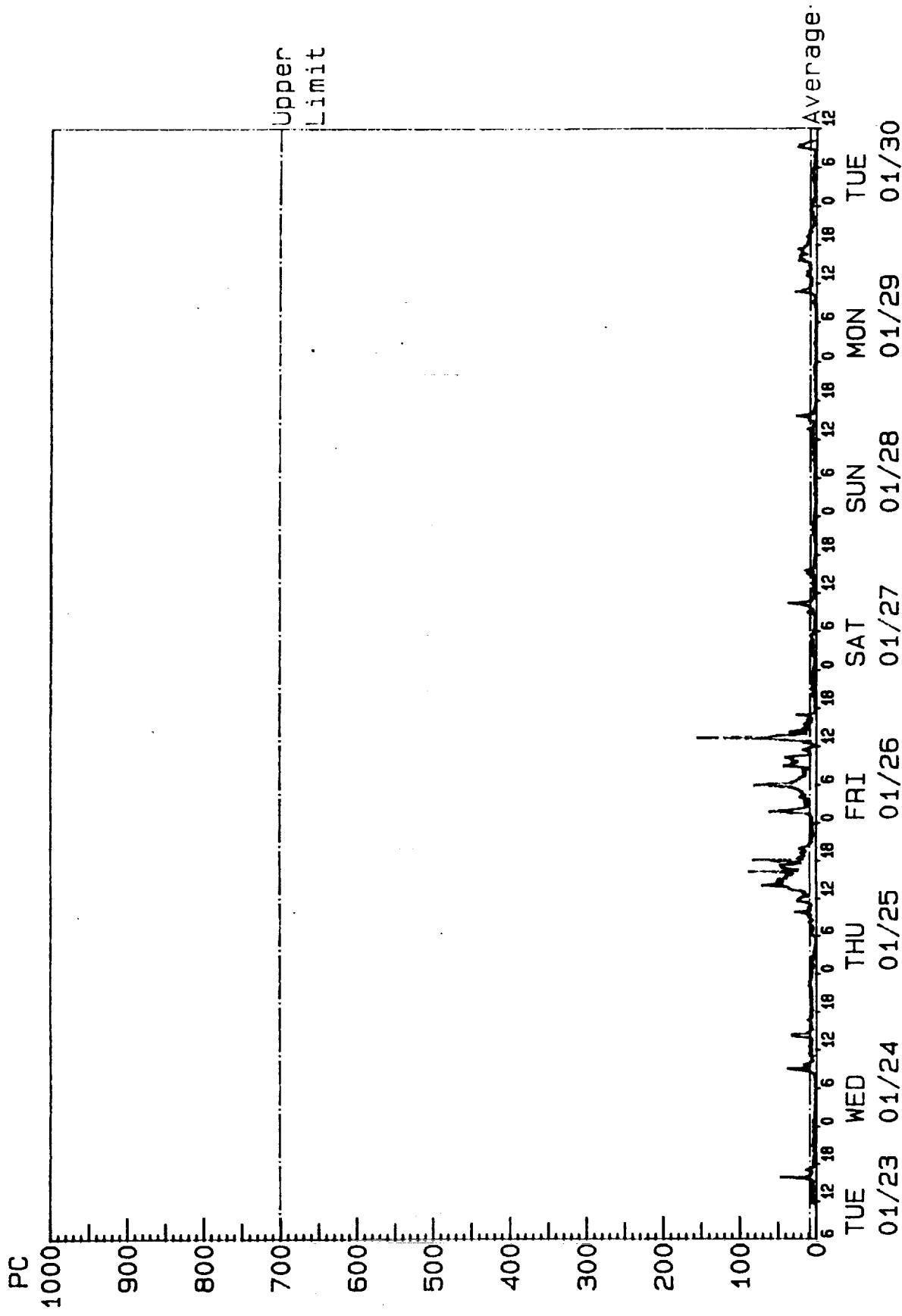
SITE: HIGH BAY EAST WALL (C01)

Upper Limit



5.0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II SITE: HIGH BAY EAST WALL (CO2)



U . S M I L E R A N D T U L L / C E D I C I

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C05)

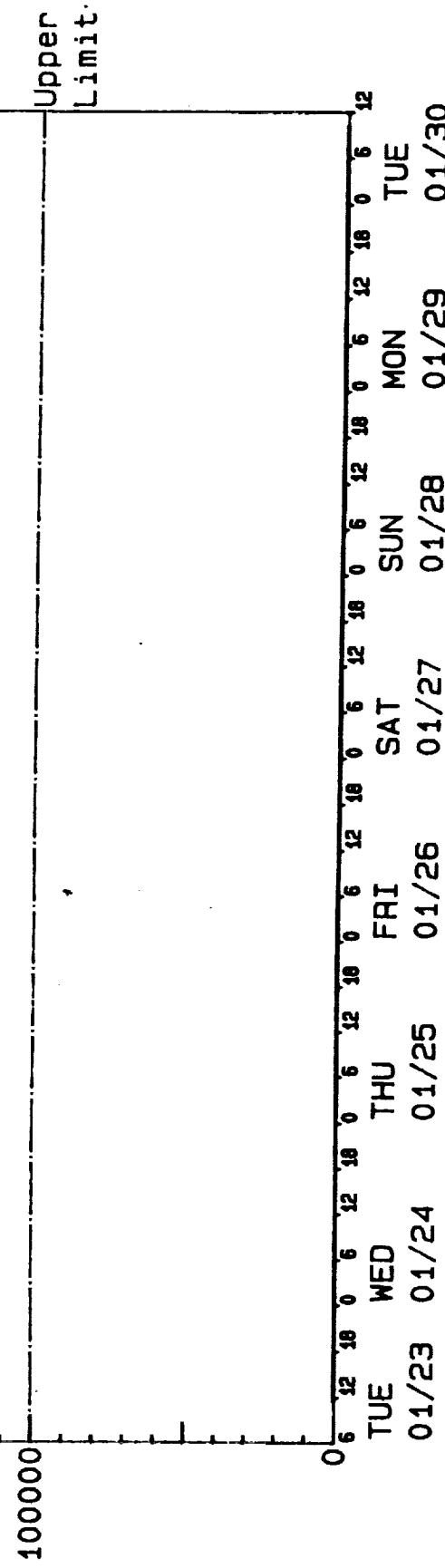
PC

300000

200000

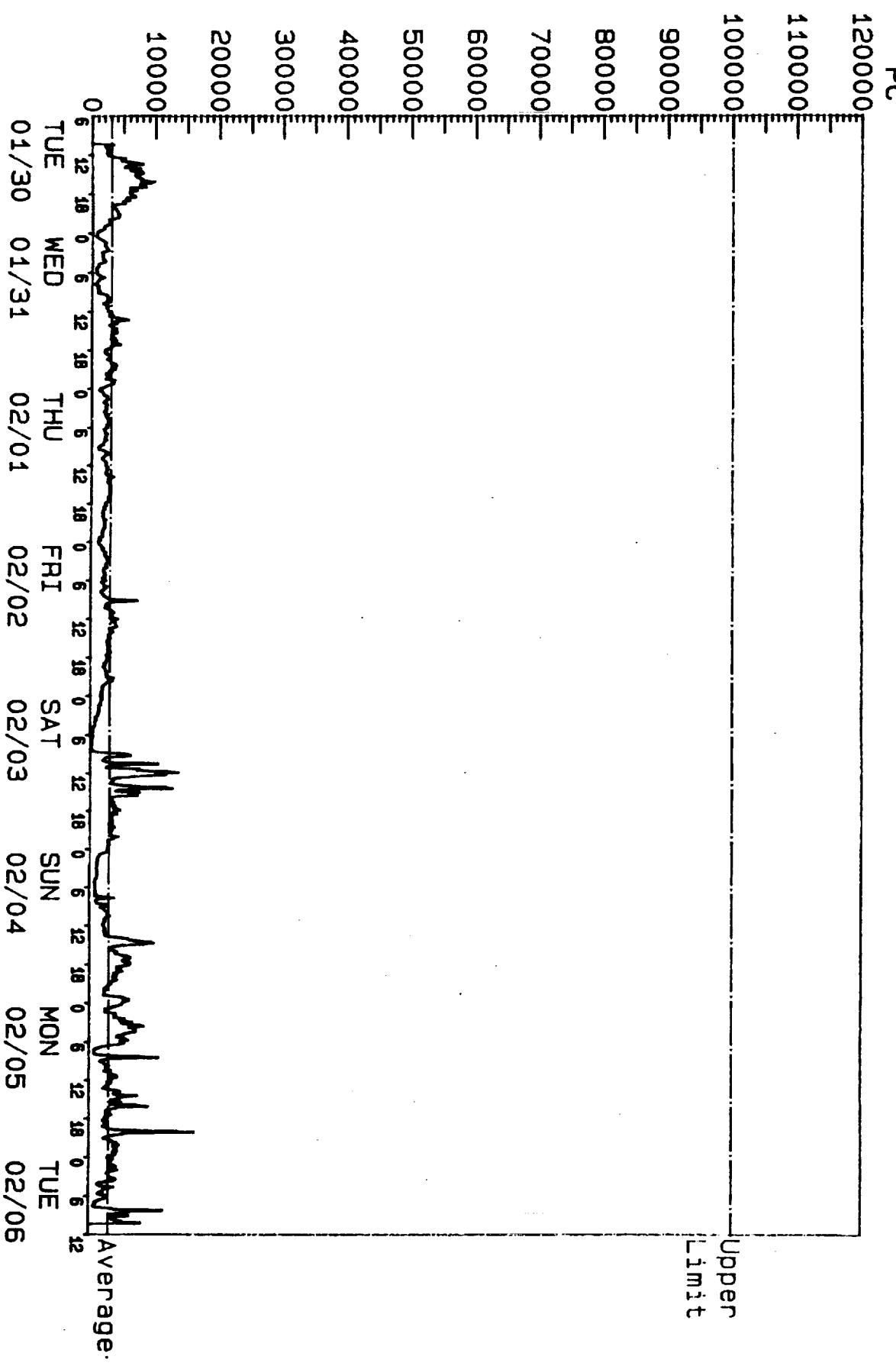
100000

0



0.5 MICRON PARTICLES / CUBIC FT

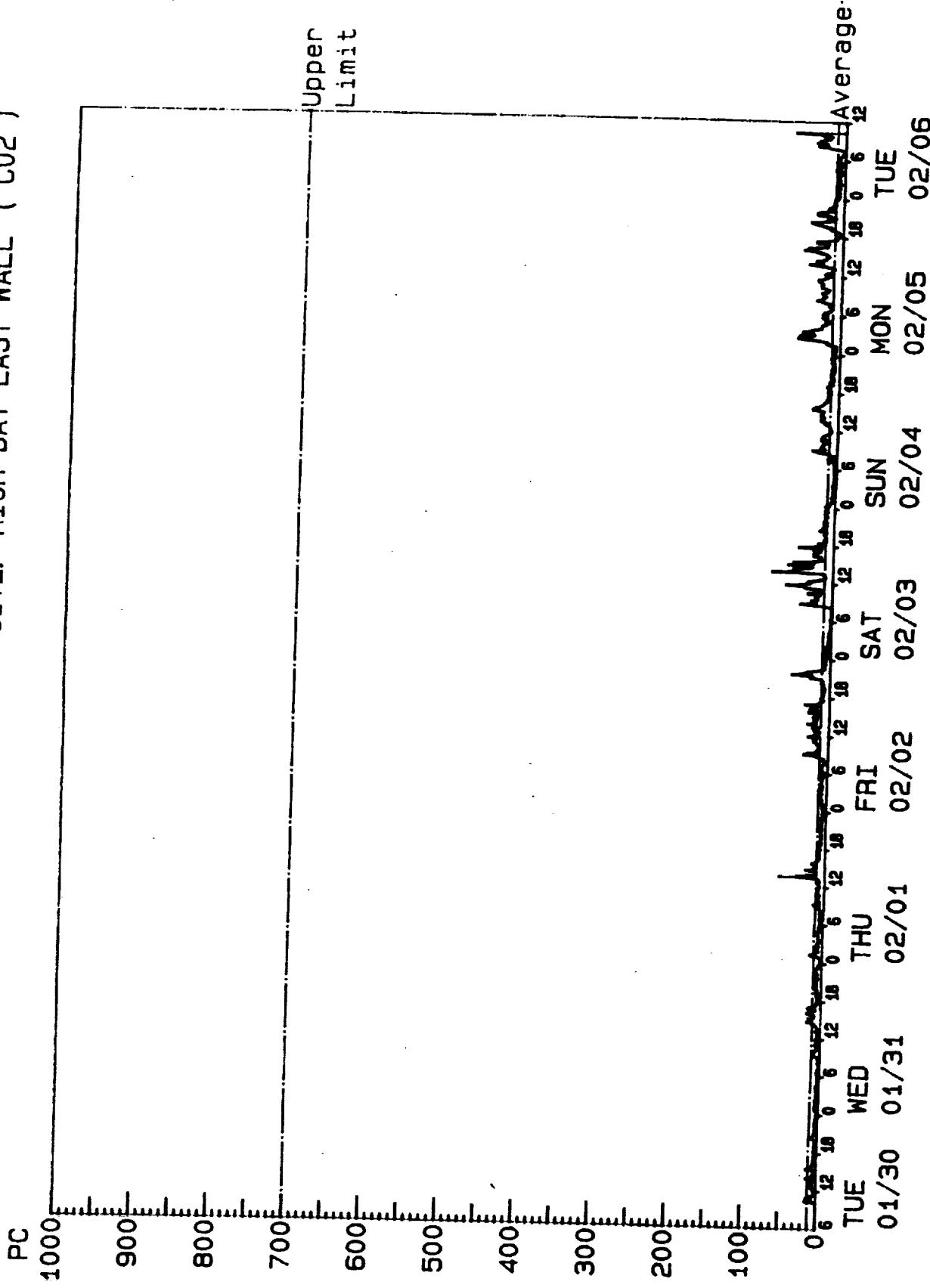
FACILITY: SAEF II SITE: HIGH BAY EAST WALL (C01)



5.0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

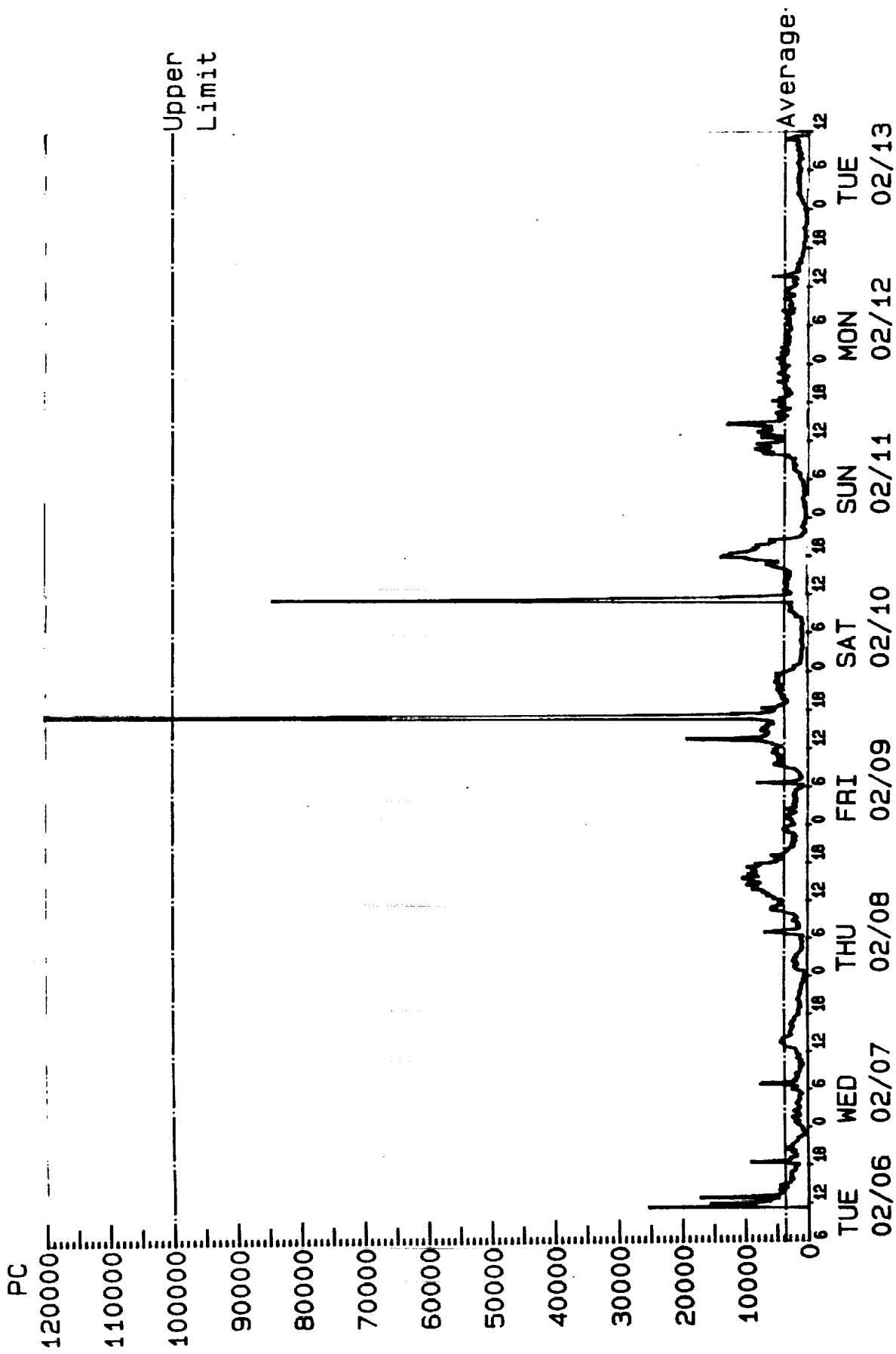
SITE: HIGH BAY EAST WALL (C02)



0.5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

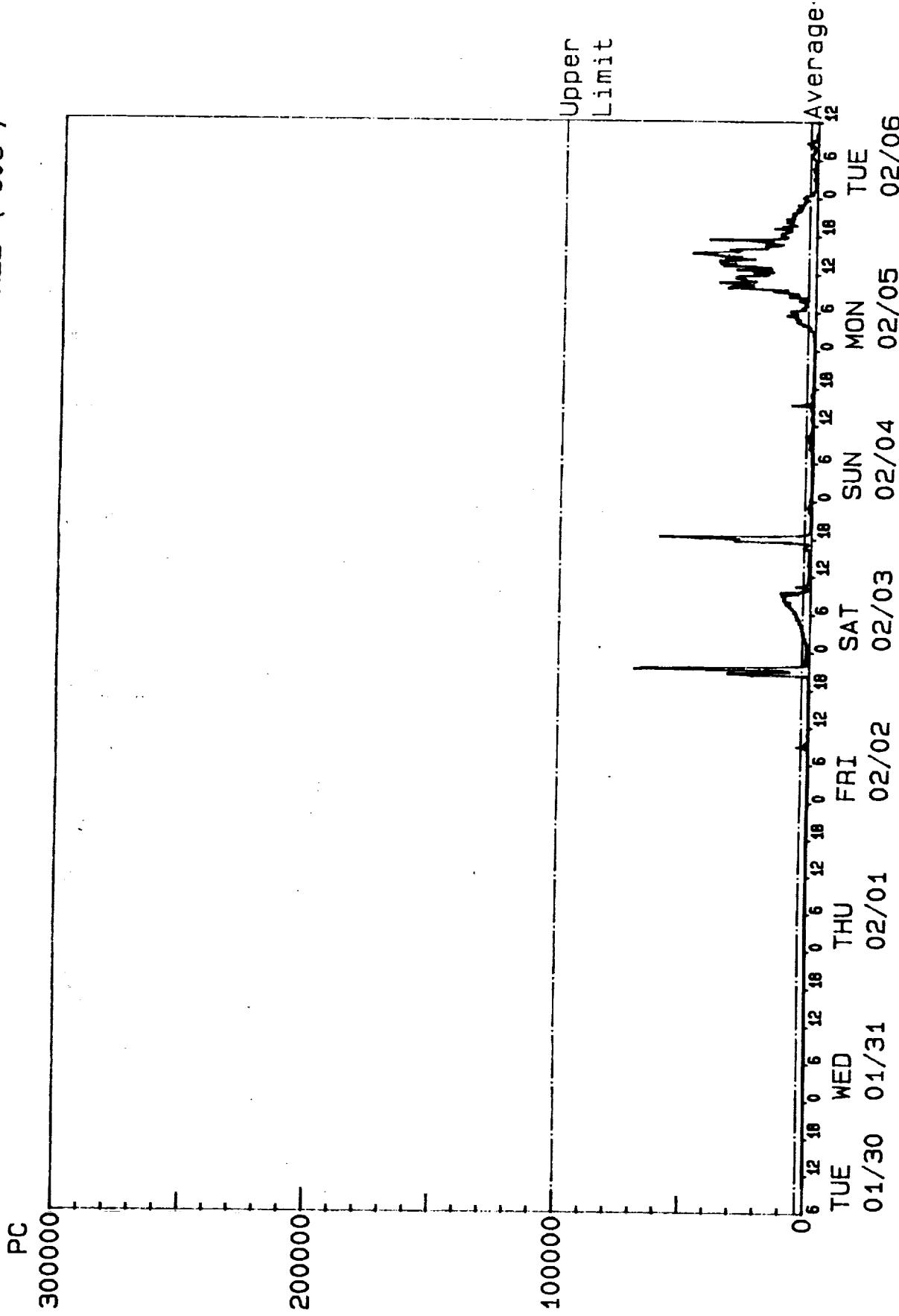
SITE: HIGH BAY EAST WALL (C01)



0.5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

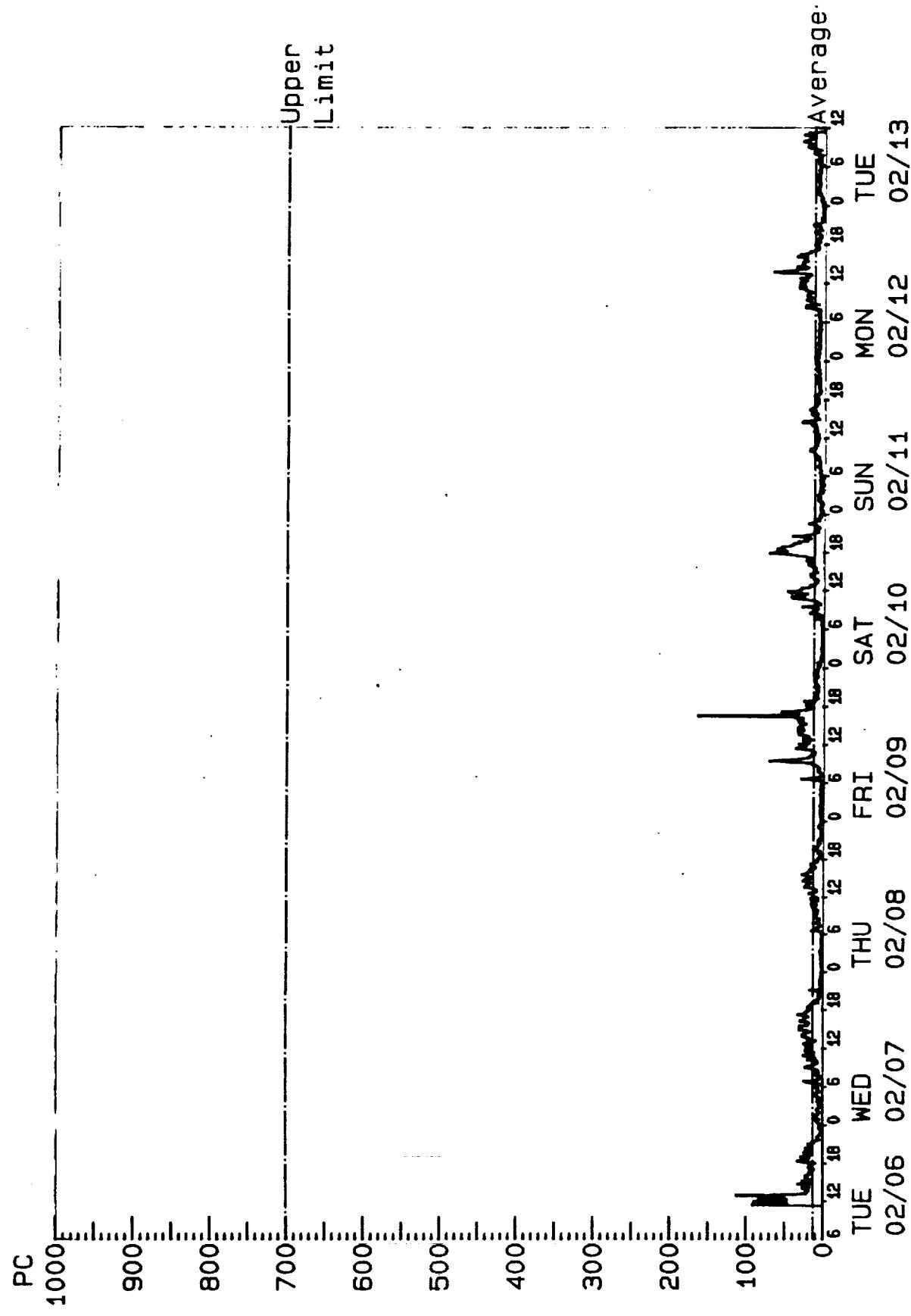
SITE: AIRLOCK EAST WALL (C05)



5.0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

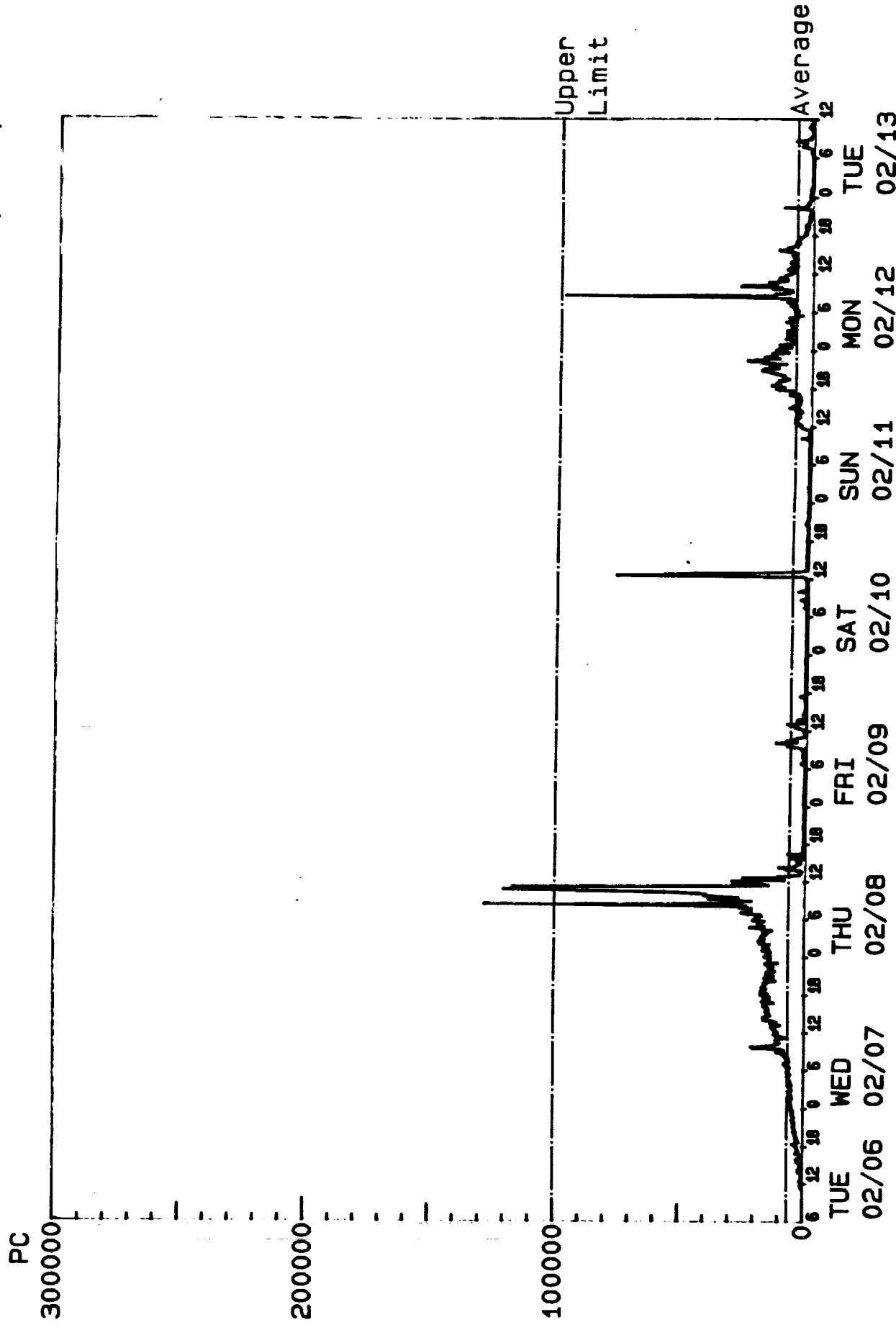
SITE: HIGH BAY EAST WALL (CO2)



U.C MILKRUN PAH INDICES / CUBIC FT

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C05)



5.0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C06)

PC

1000

900

800

700

600

500

400

300

200

100

0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12 18 0 6 12
TUE WED THU FRI SAT SUN MON TUE TUE
02/06 02/07 02/08 02/09 02/10 02/11 02/12 02/13

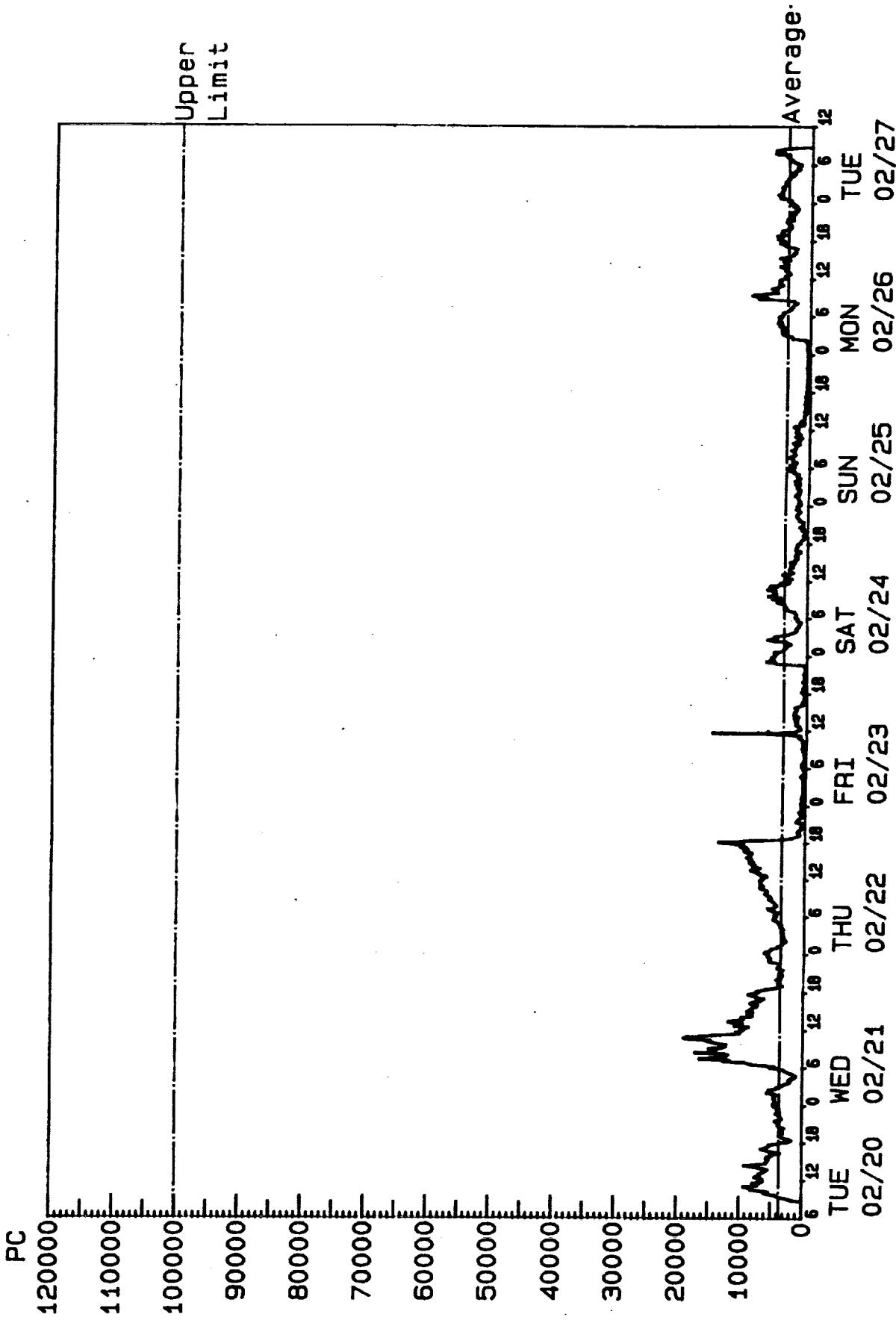
Upper
Limit.

0.5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C01)

Upper
Limit

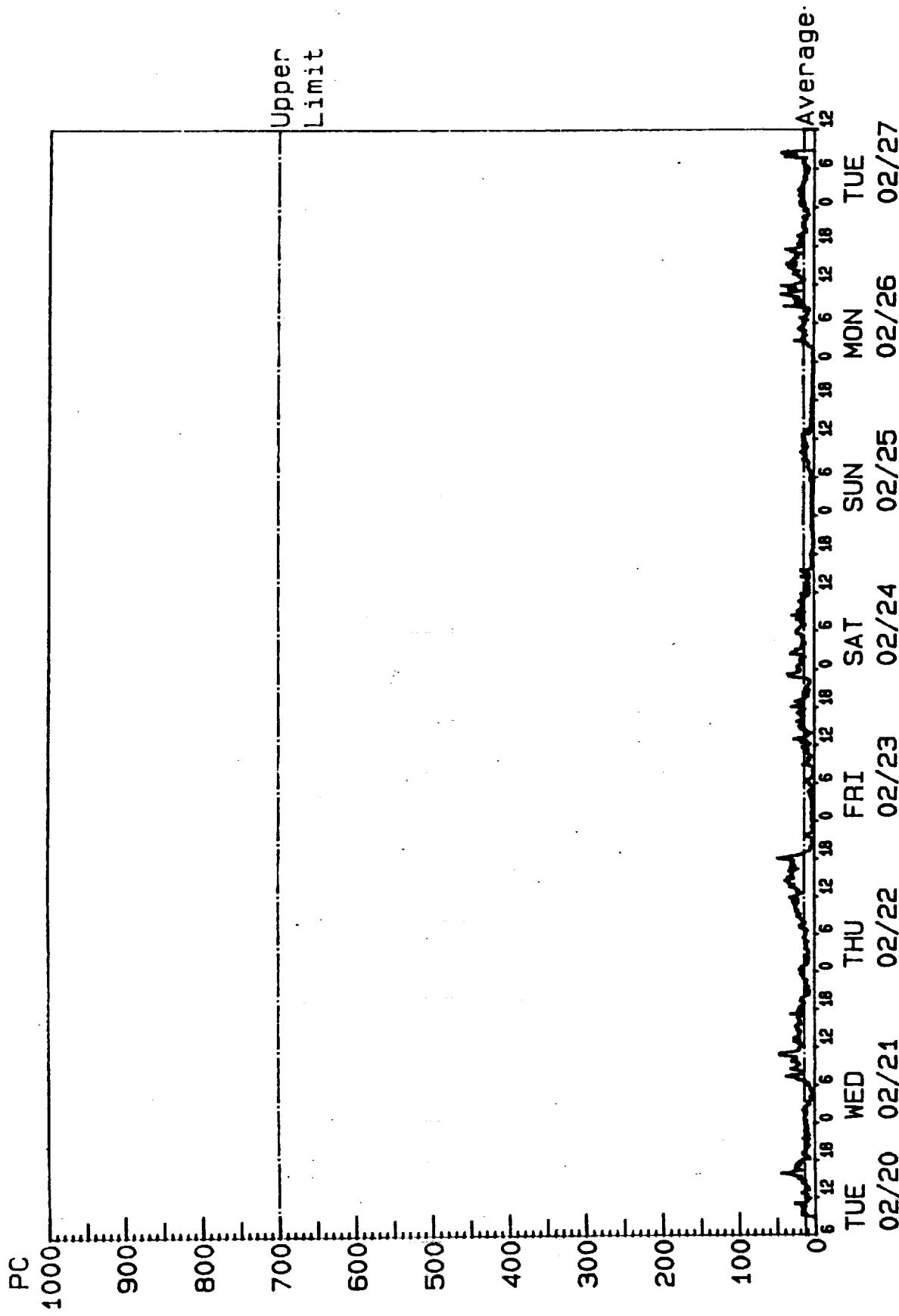


5.0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C02)

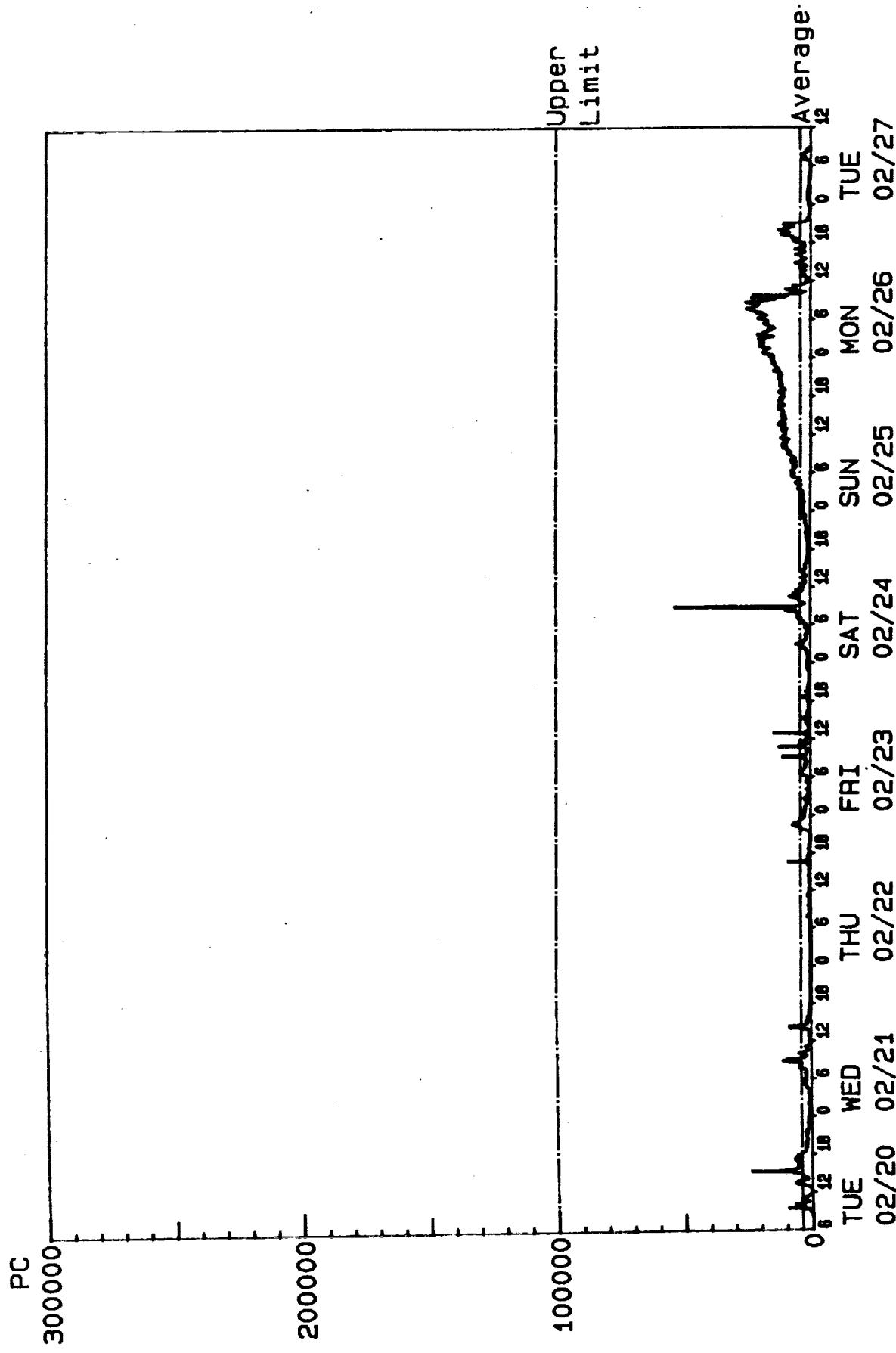
Upper Limit



0.5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

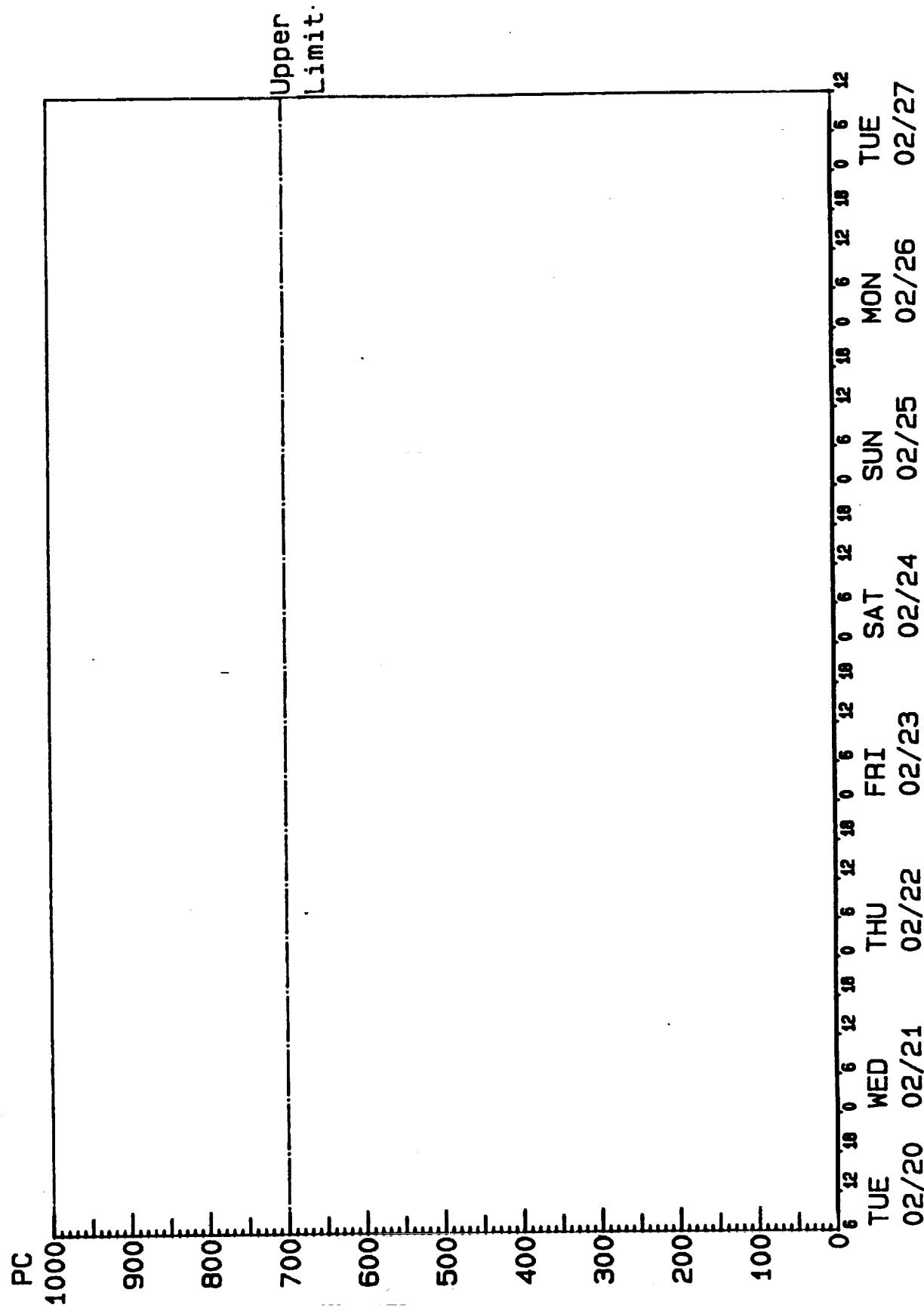
SITE: AIRLOCK EAST WALL (C05)



5.0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C06)

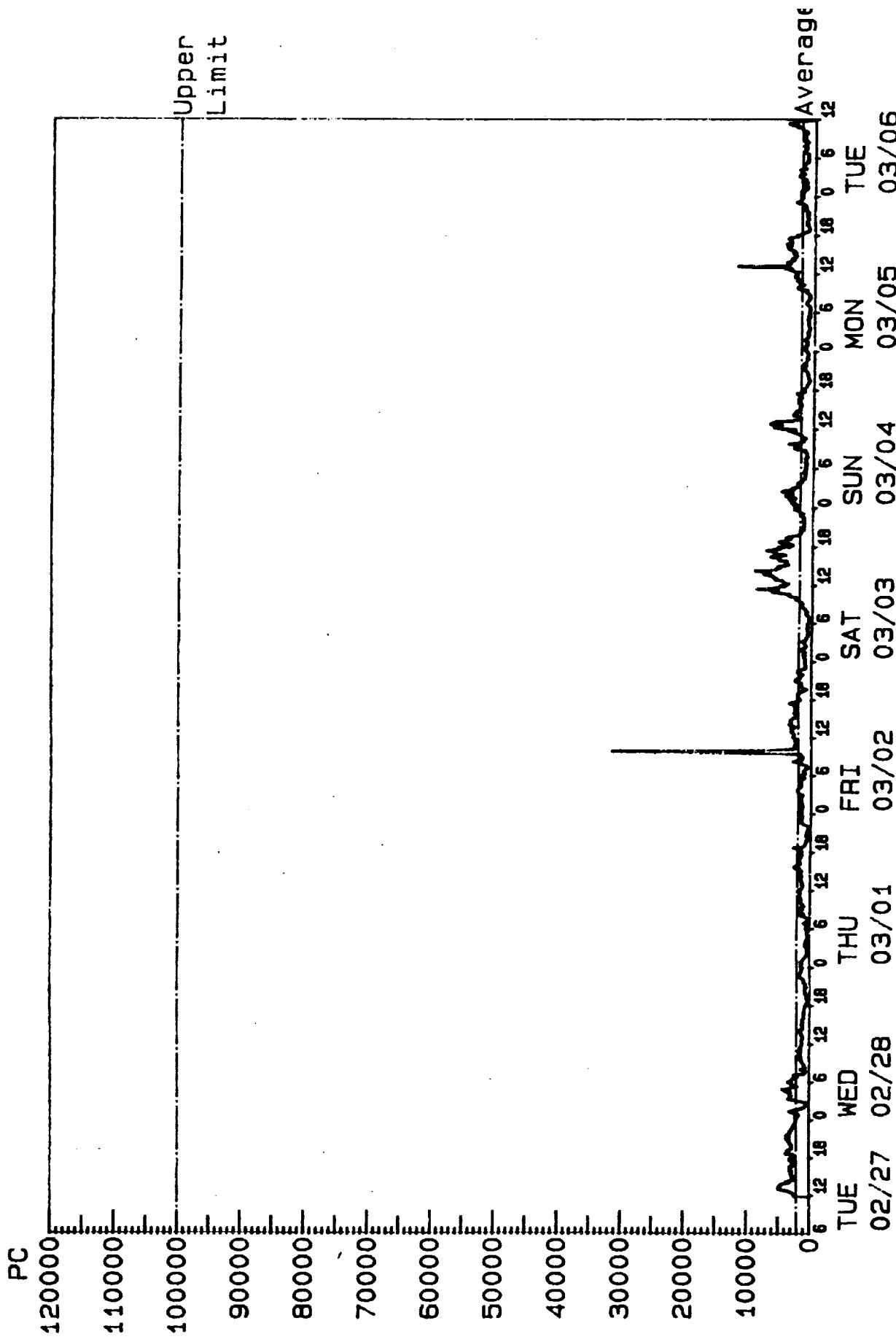


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FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C04)

Upper
Limit



0.5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

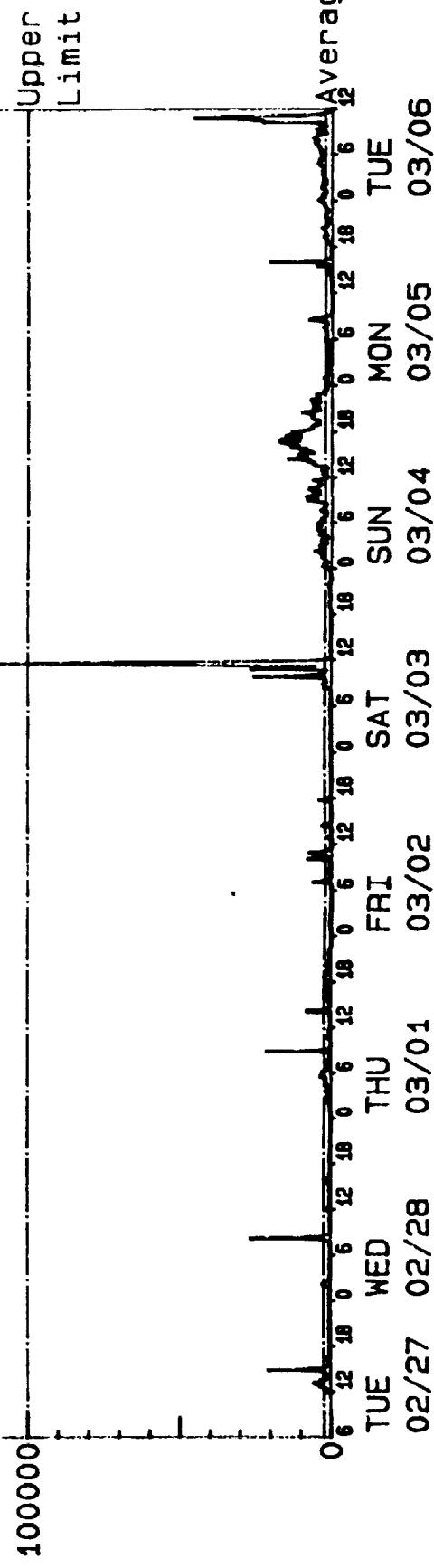
SITE: AIRLOCK EAST WALL (C05)

PC

300000

200000

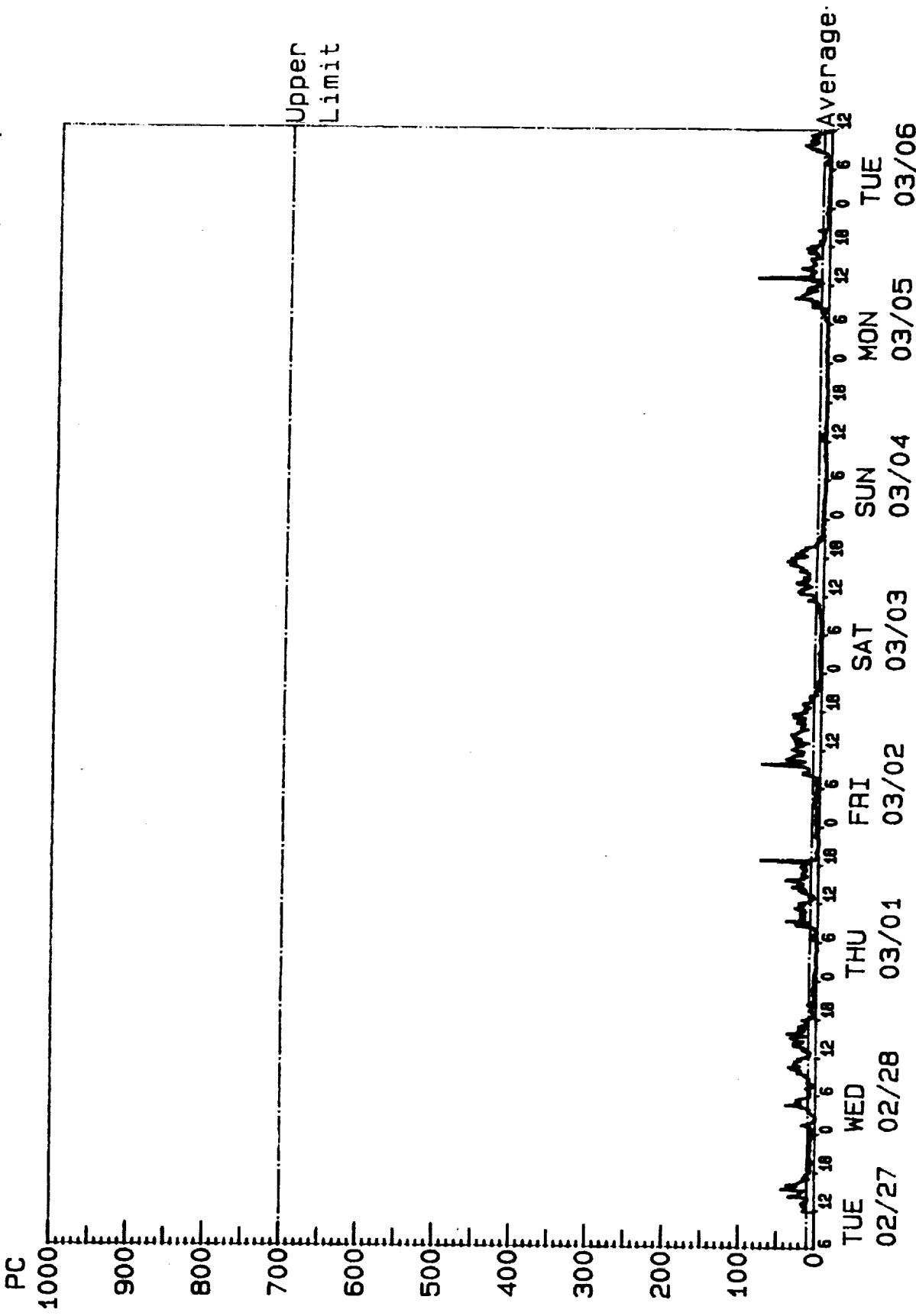
100000



5.0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

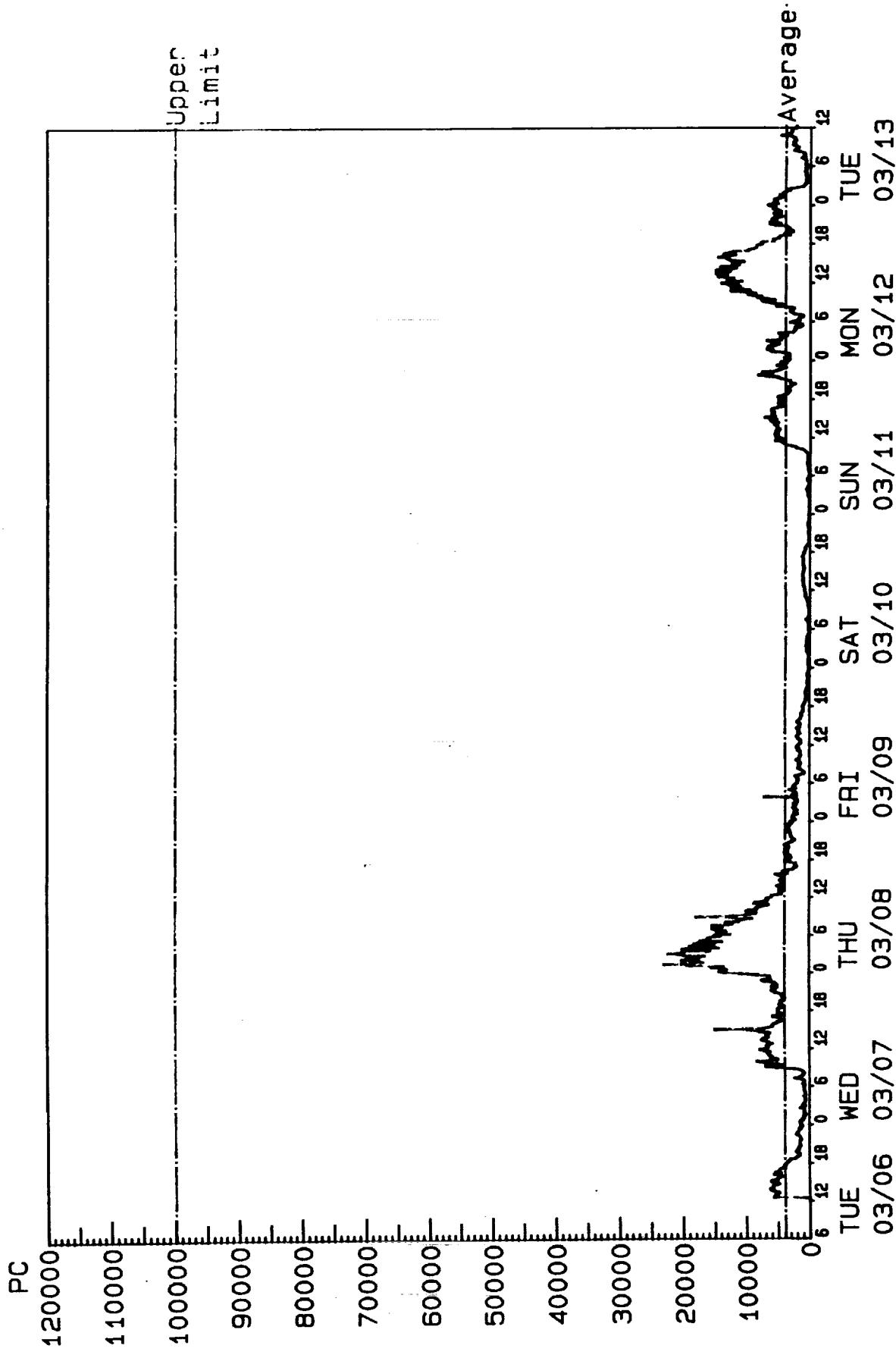
SITE: HIGH BAY EAST WALL (C02)



0.5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C01)



5 . 0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (CO2)

PC

1000

900

800

700

600

500

400

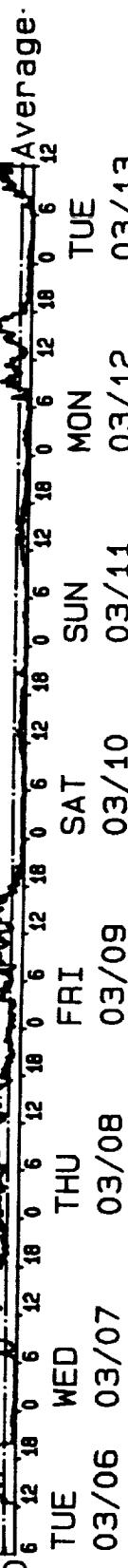
300

200

100

0

Upper
Limit



FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C05)

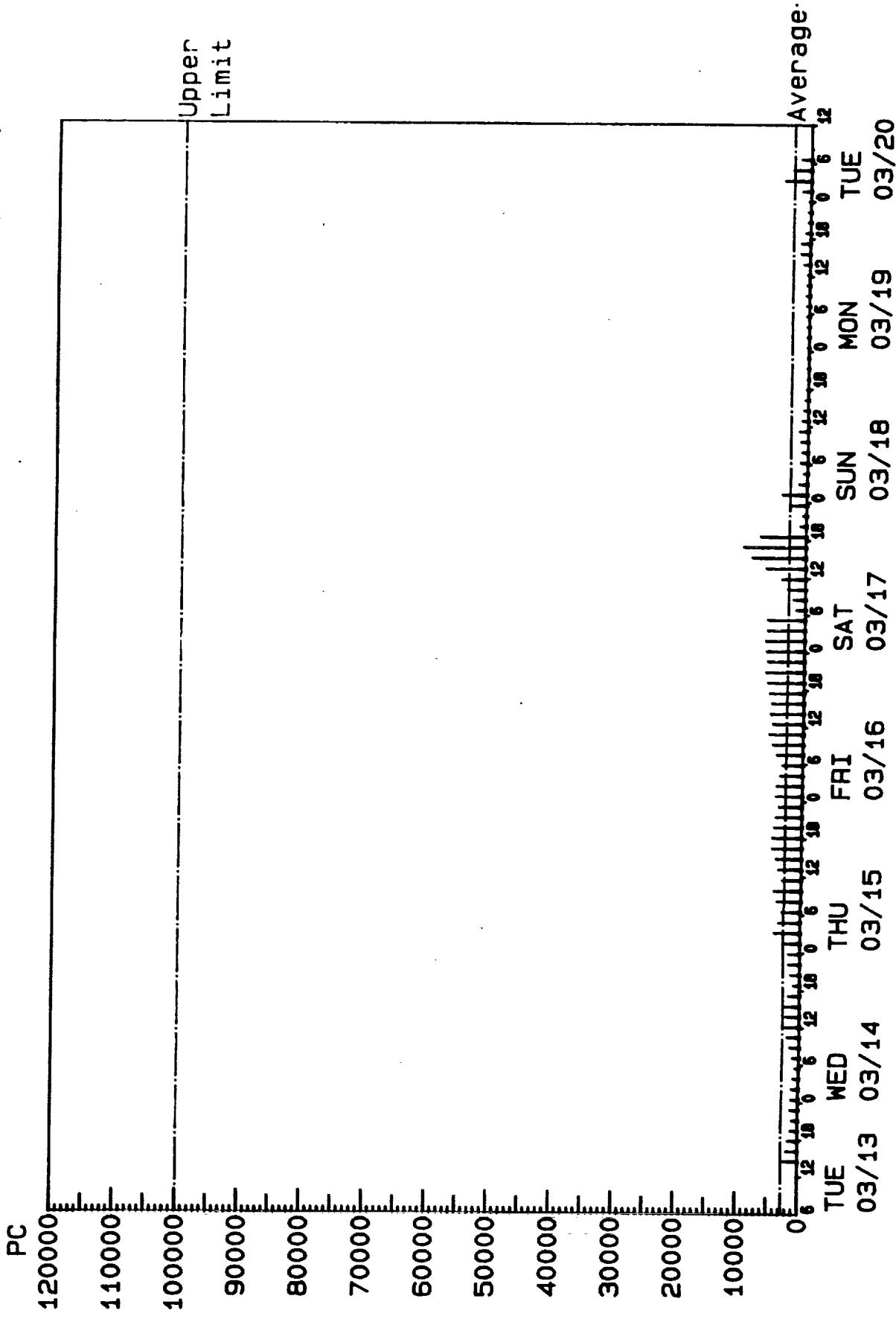
PC
300000

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0 . 5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C01)



5.0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (CO2)

PC

1000

900

800

700

600

500

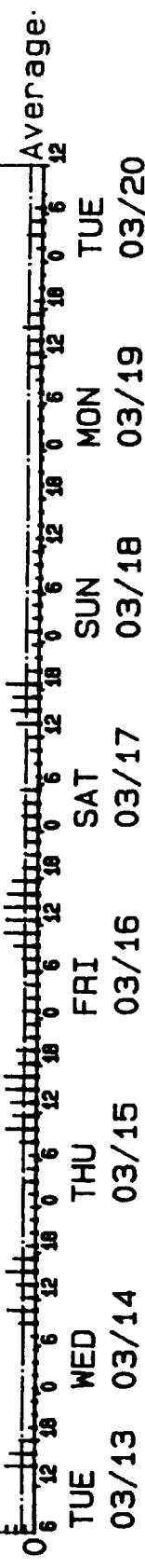
400

300

200

100

Upper
Limit



0 . 5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C05)

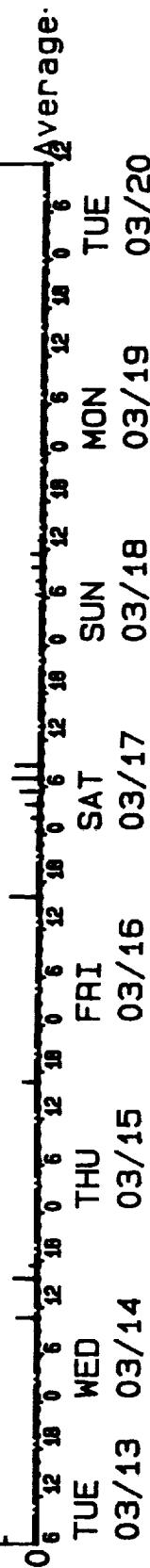
PC

3000000

2000000

1000000

Upper
Limit



5.0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C06)

PC

1000

900

800

700

600

500

400

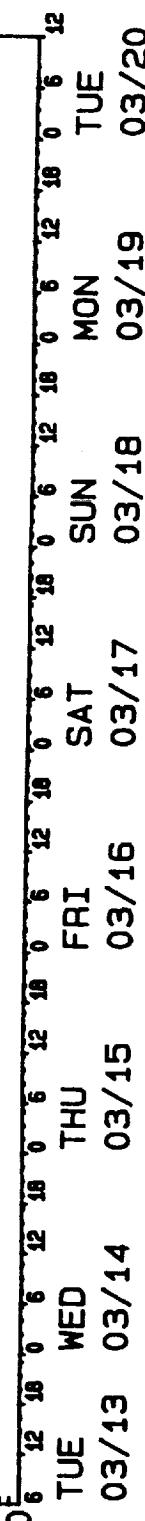
300

200

100

0

Upper
Limit.



0.5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C01)

PC

120000

110000

100000

90000

80000

70000

60000

50000

40000

30000

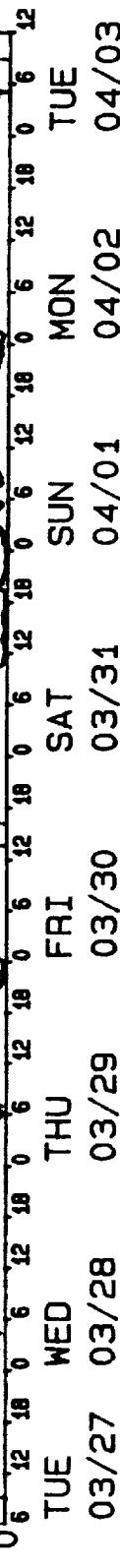
20000

10000

0

Upper
Limit

Average

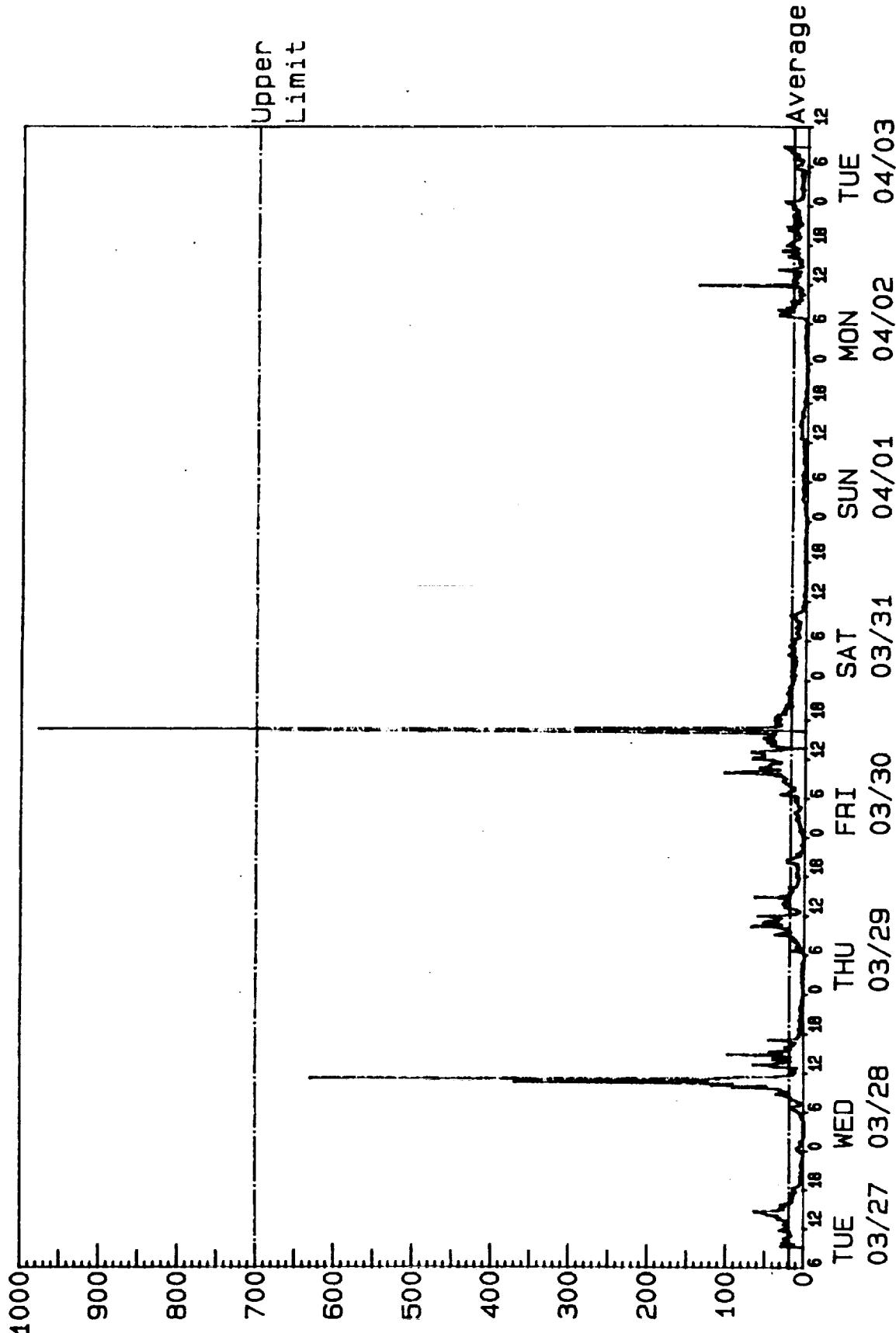


5.0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF III

SITE: HIGH BAY EAST WALL (C02)

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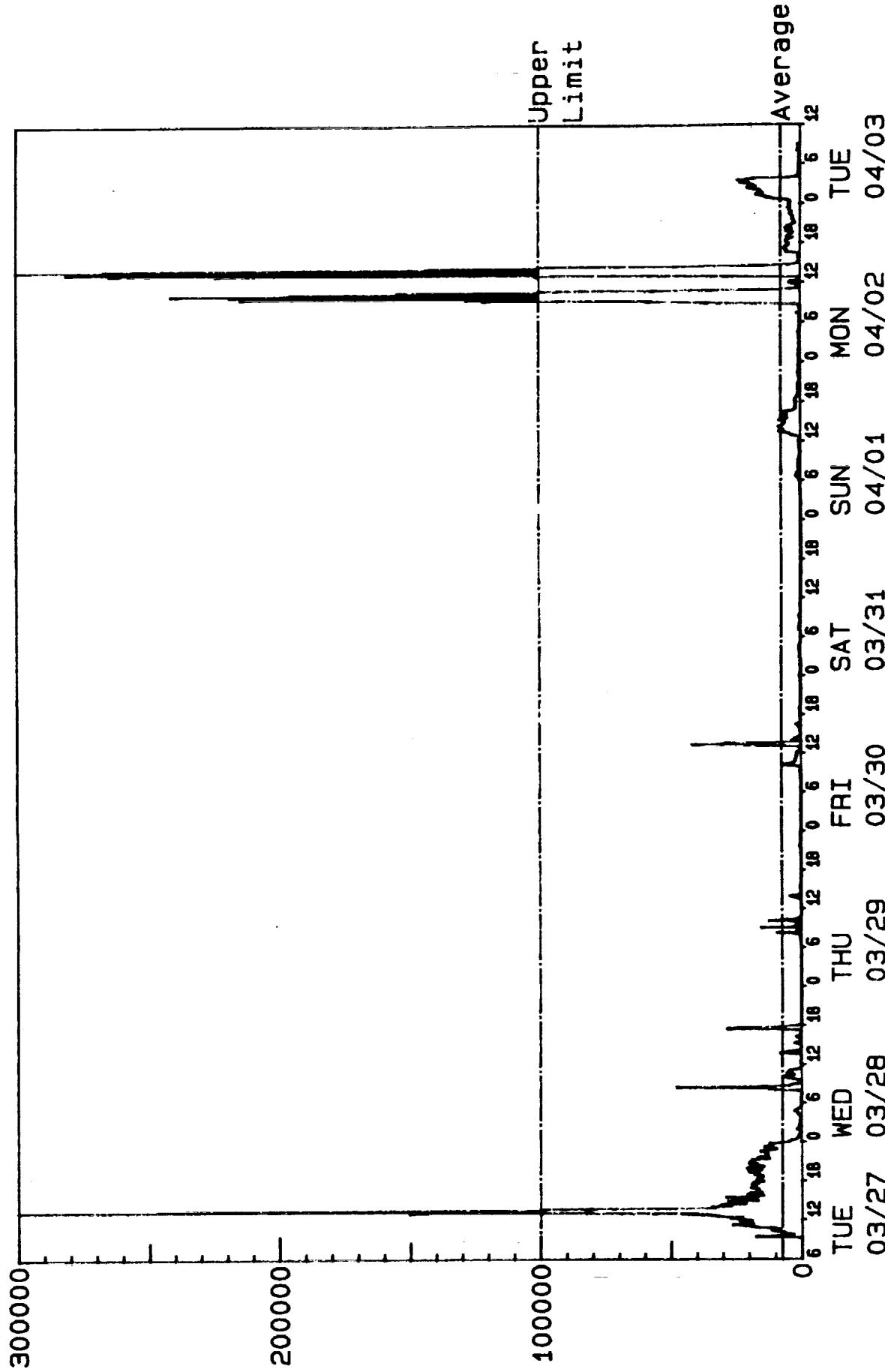
0 . 5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C05)

PC

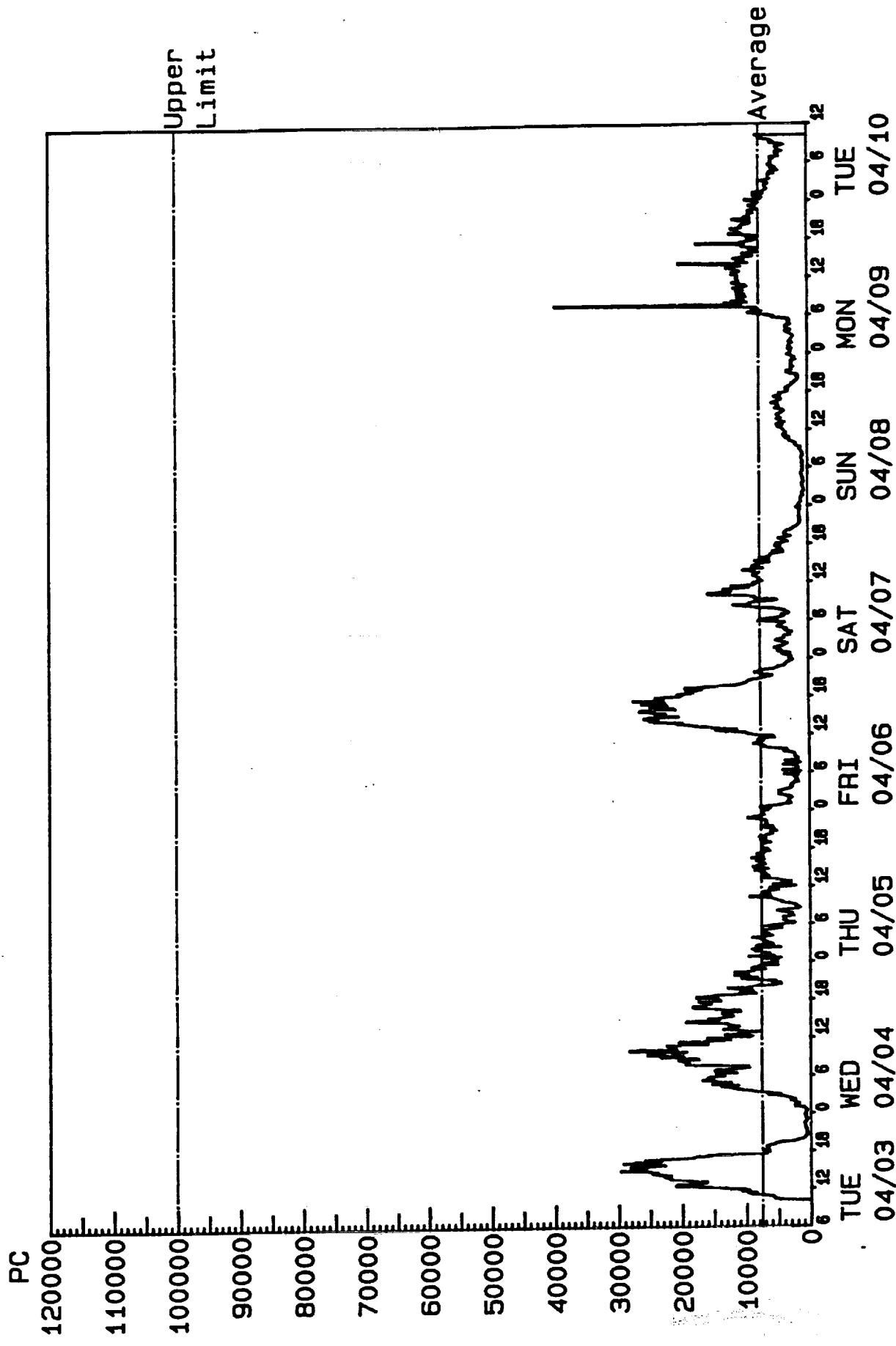
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0 . 5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

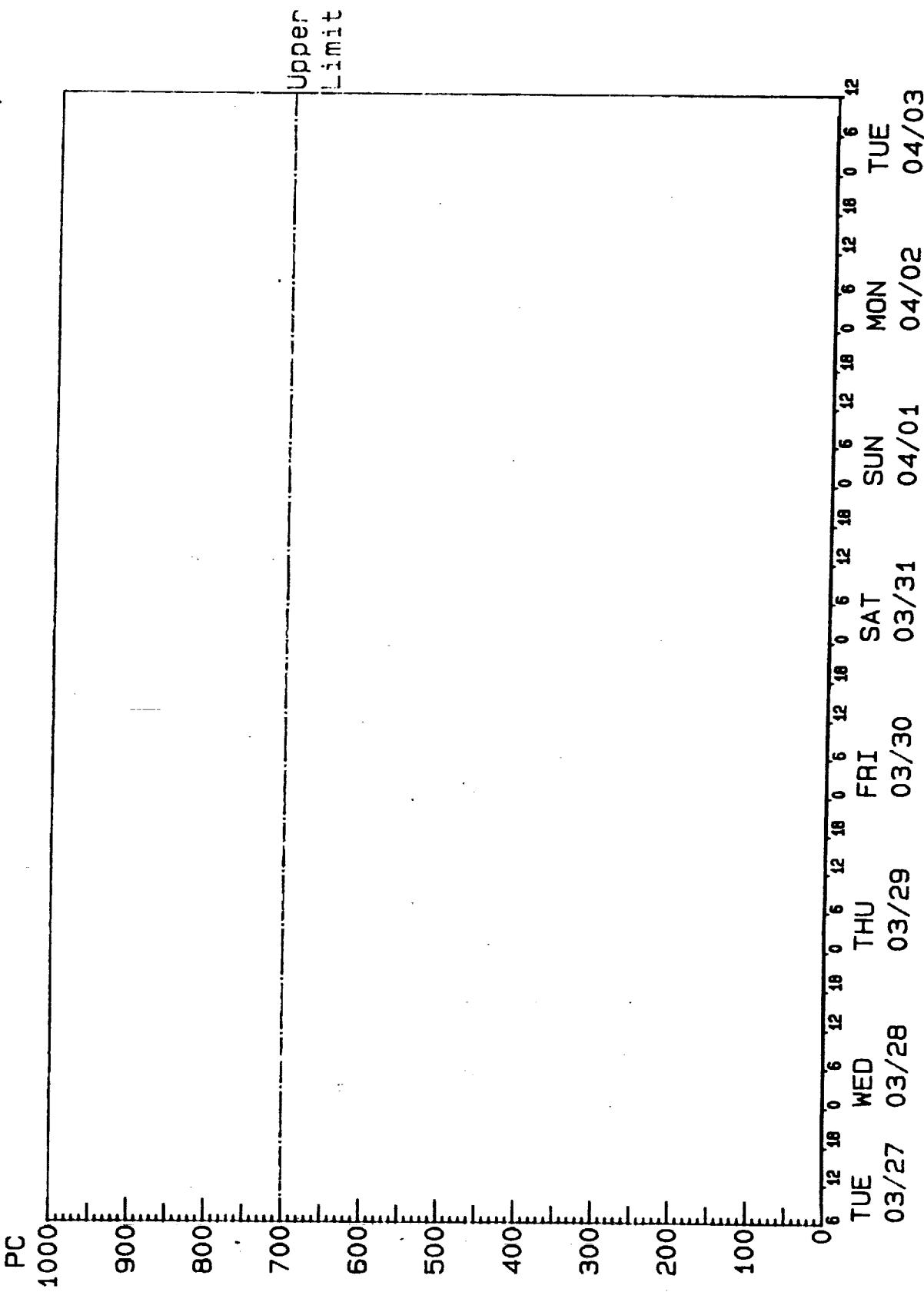
SITE: HIGH BAY EAST WALL (C01)



5.0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

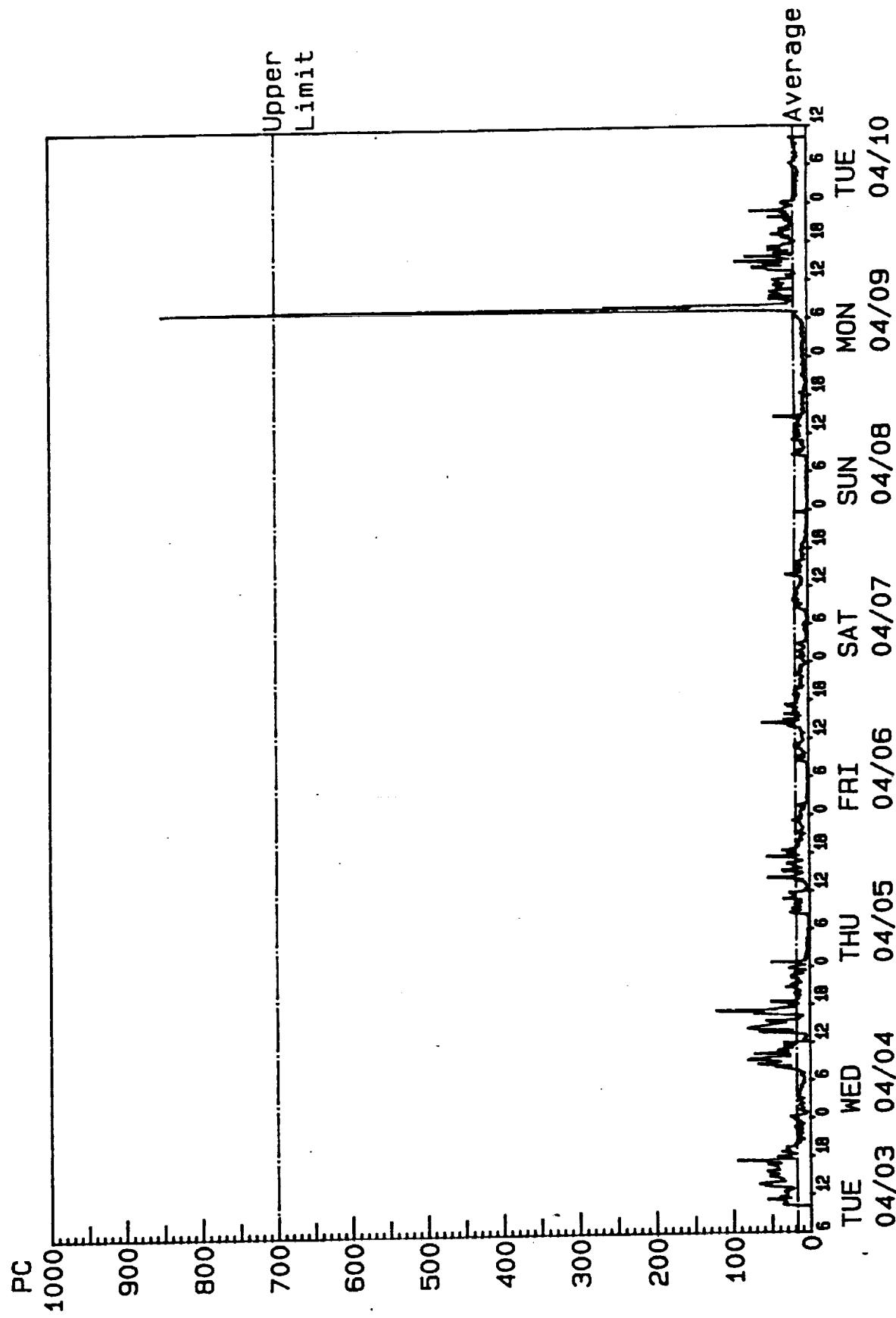
SITE: AIRLOCK EAST WALL (C06)



5.0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

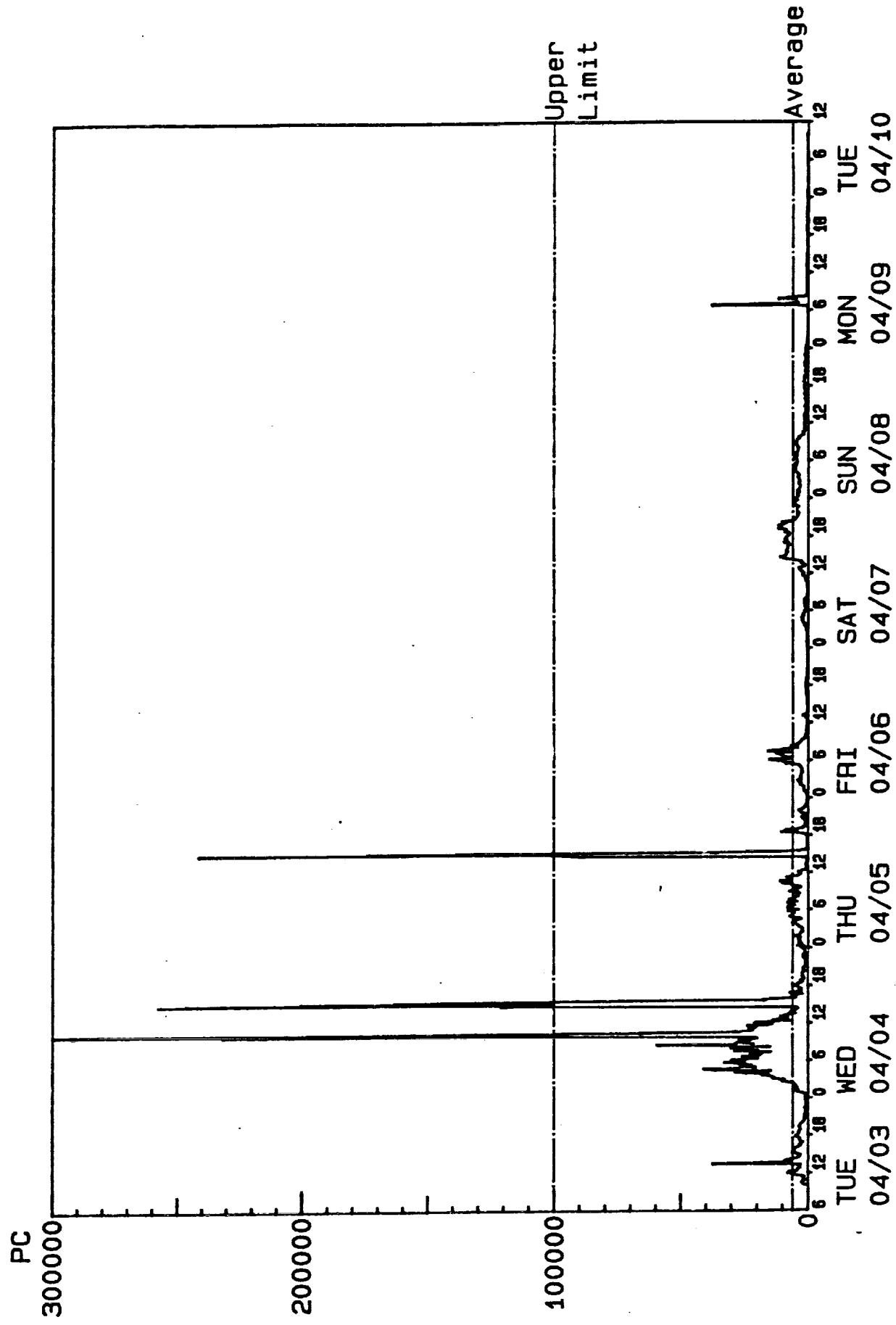
SITE: HIGH BAY EAST WALL (C02)



0.5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C05)

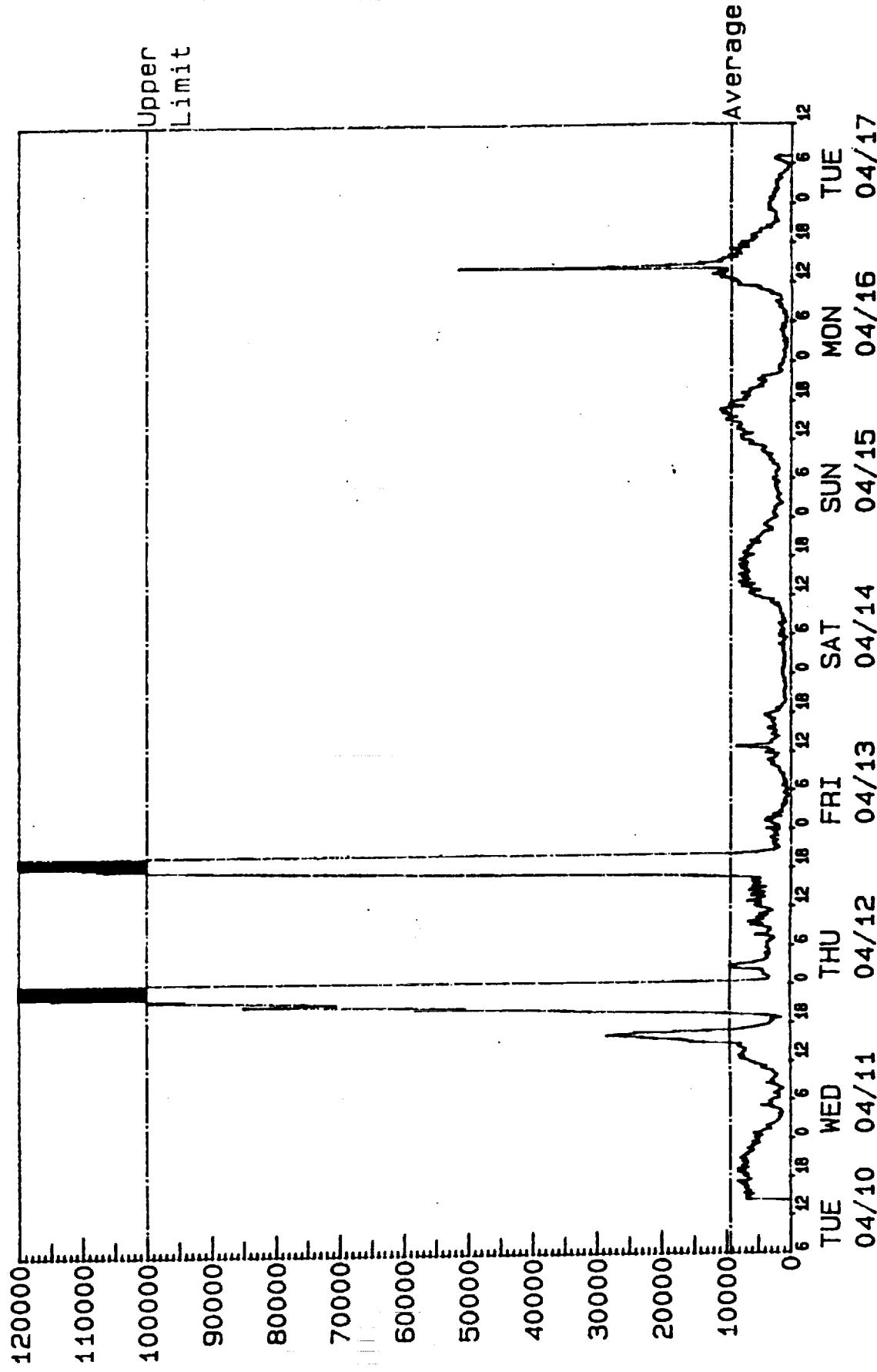


0.5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C01)

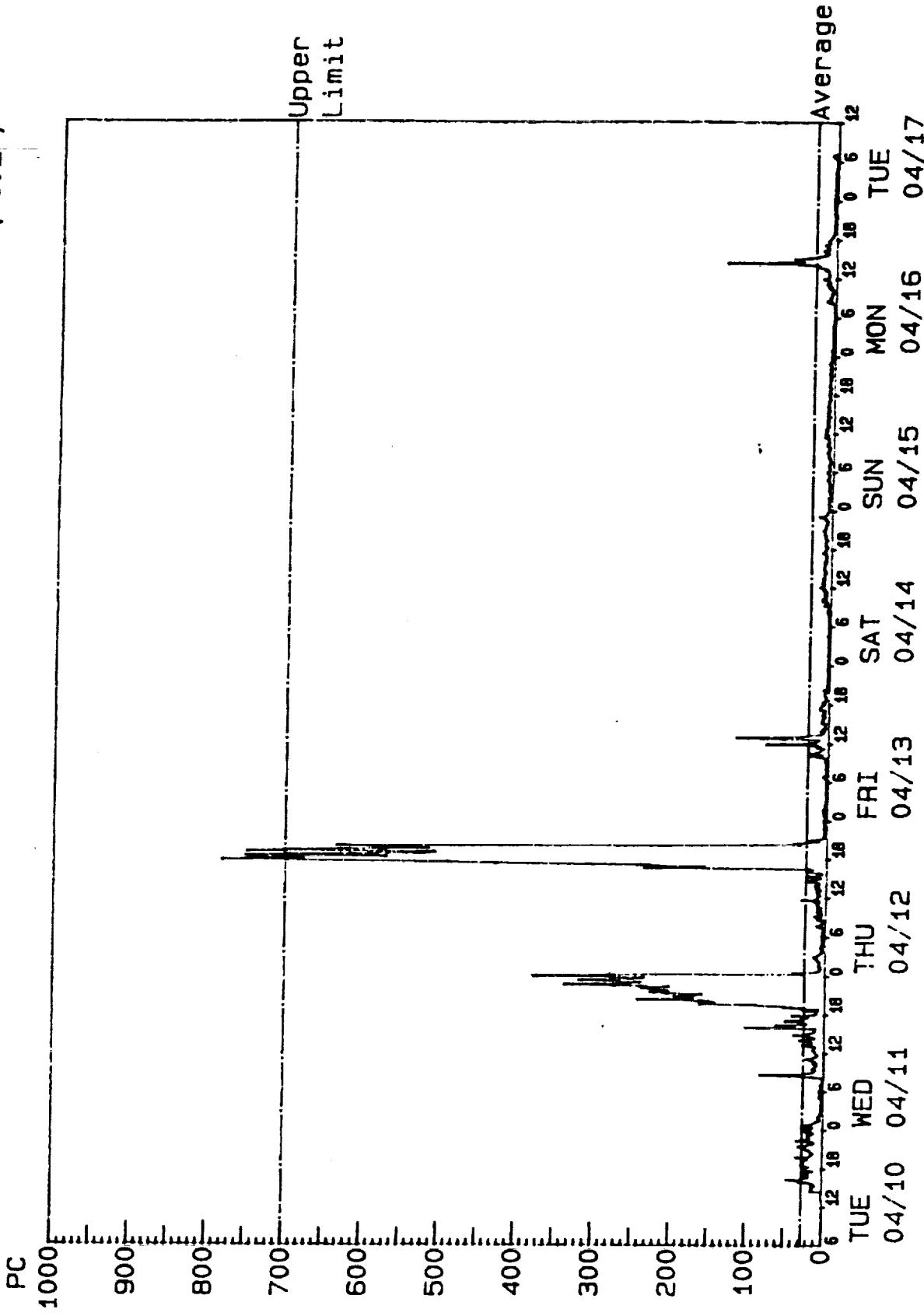
2



5.0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

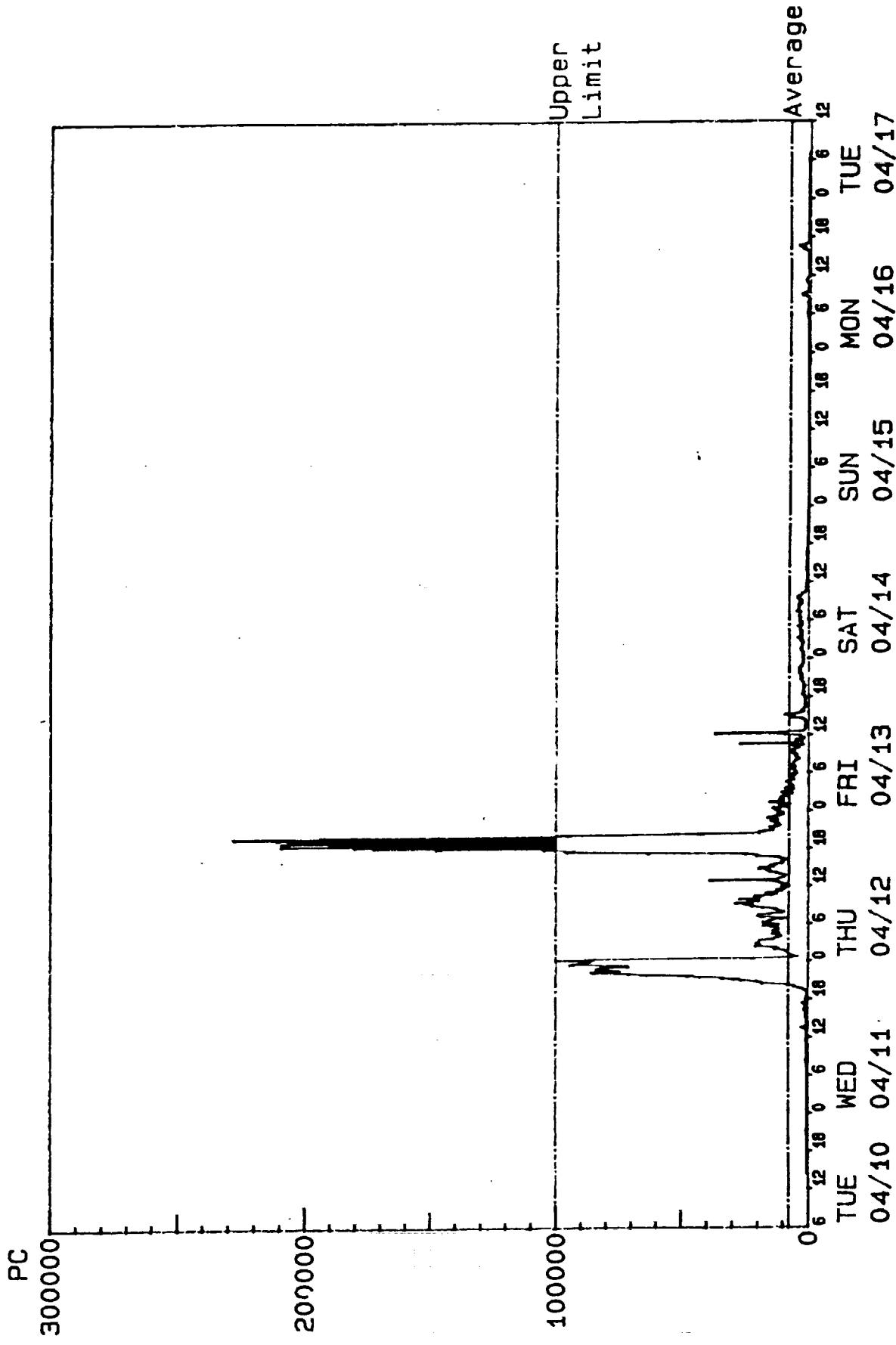
SITE: HIGH BAY EAST WALL (CO2)



0.5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

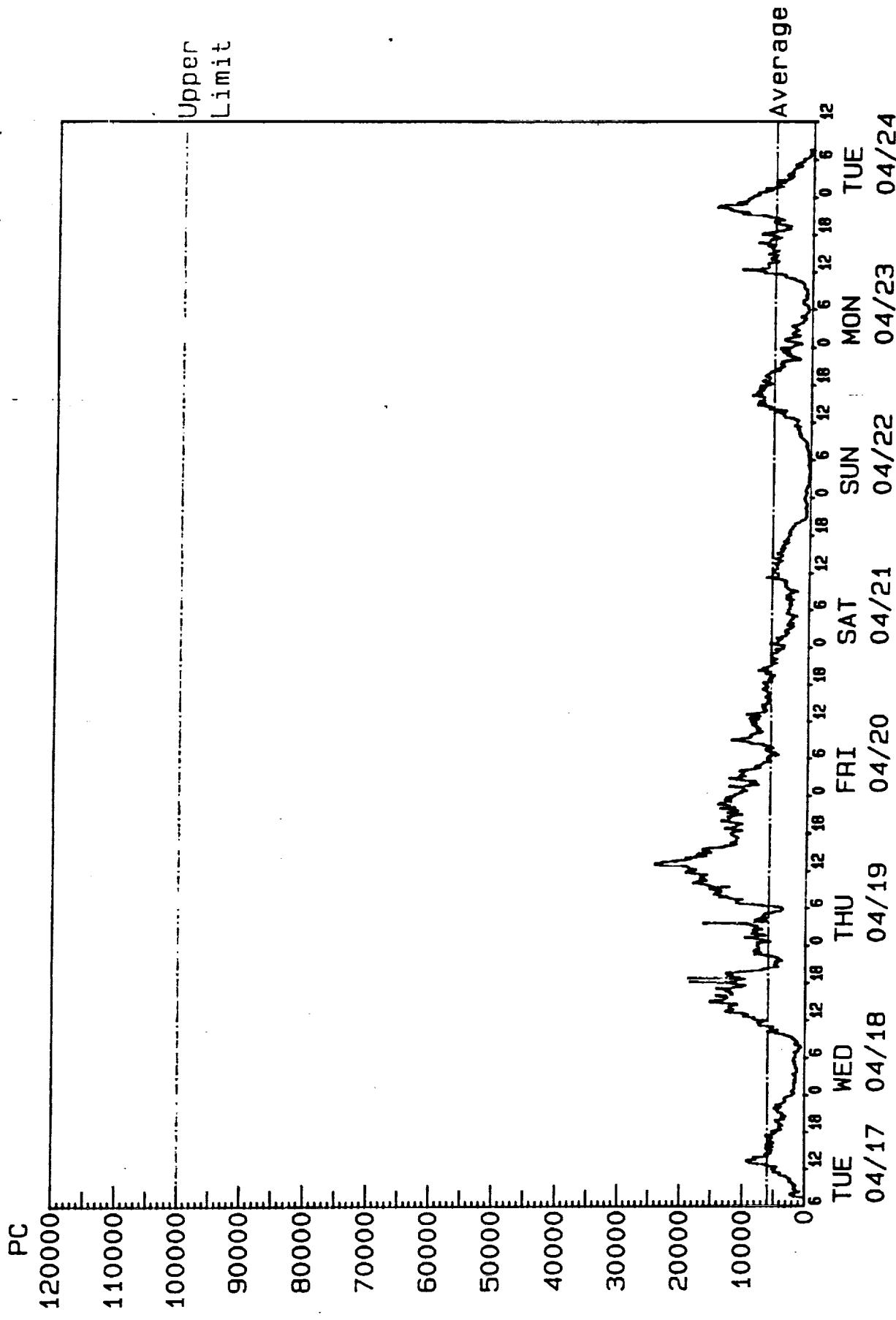
SITE: AIRLOCK EAST WALL (C05)



0.5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C01)

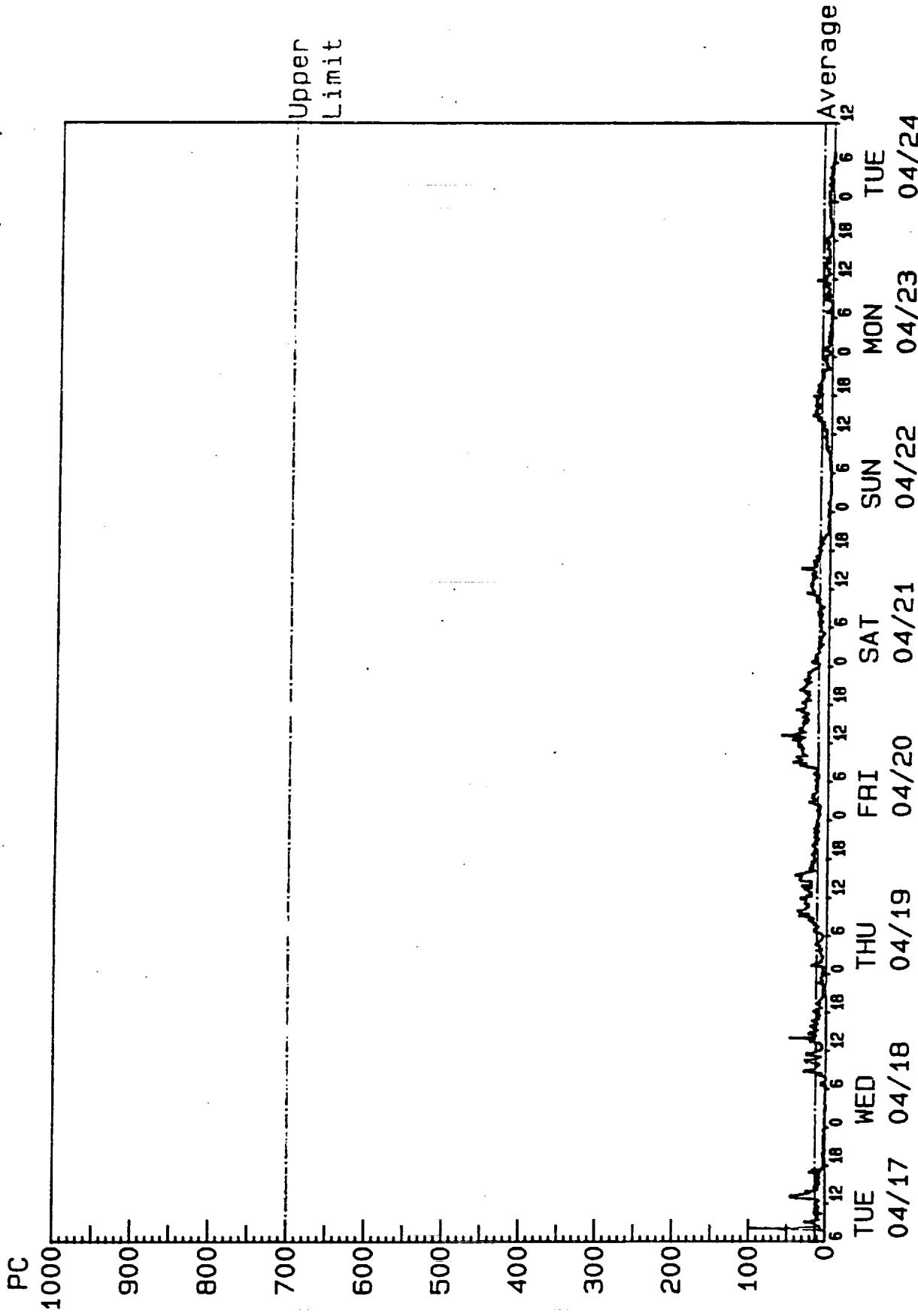


5.0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (CO2)

Upper
Limit



0 . 5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C05)

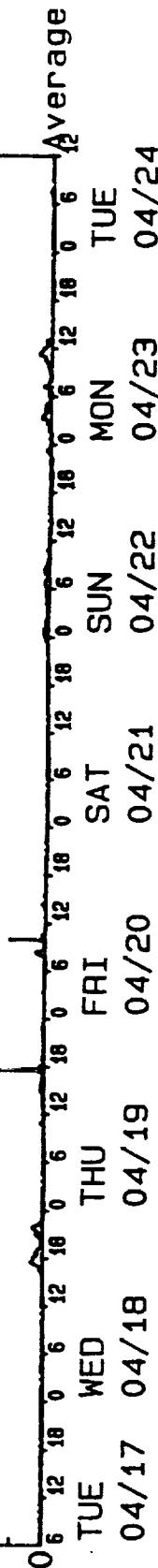
PC

300000

200000

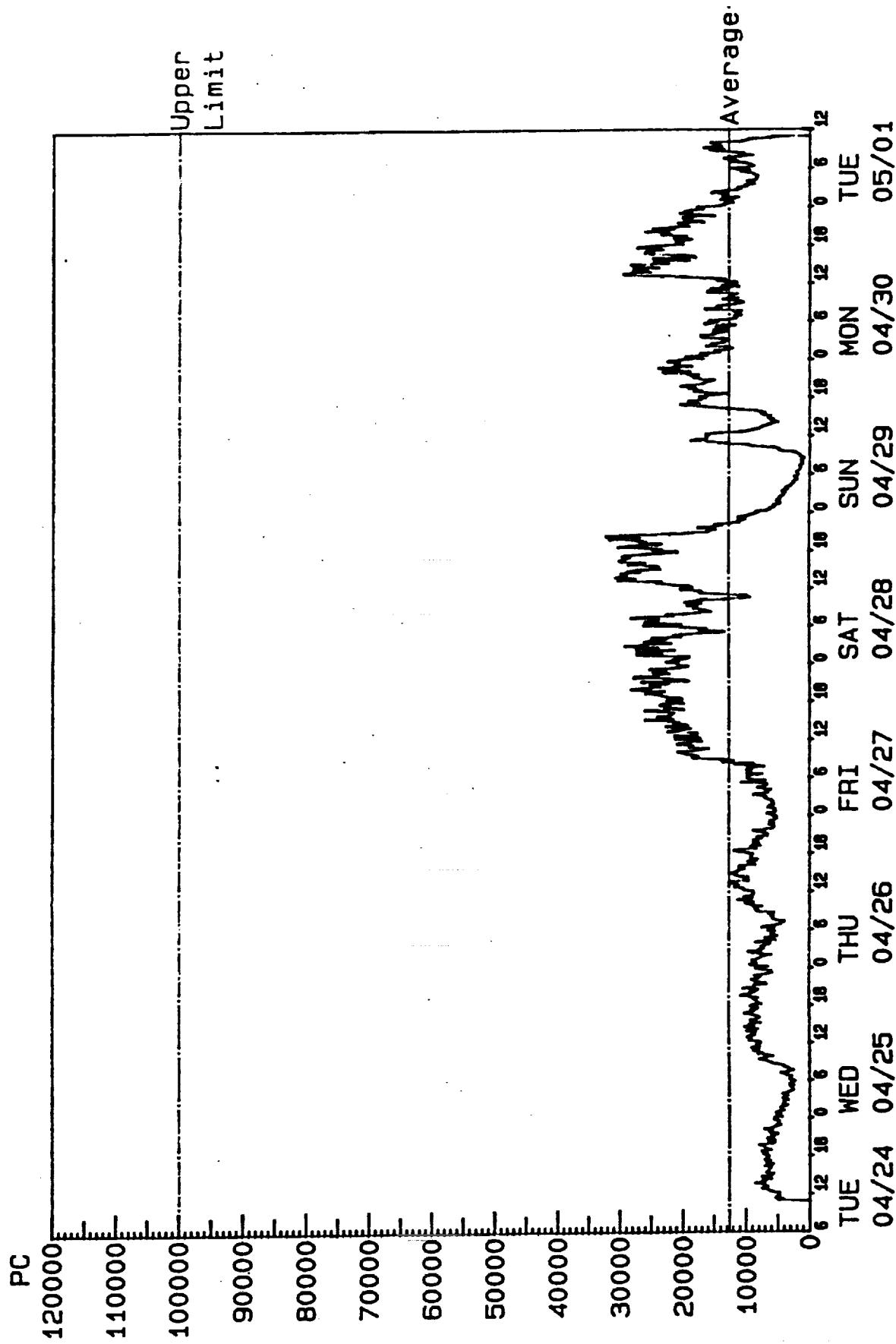
100000

Upper
Limit



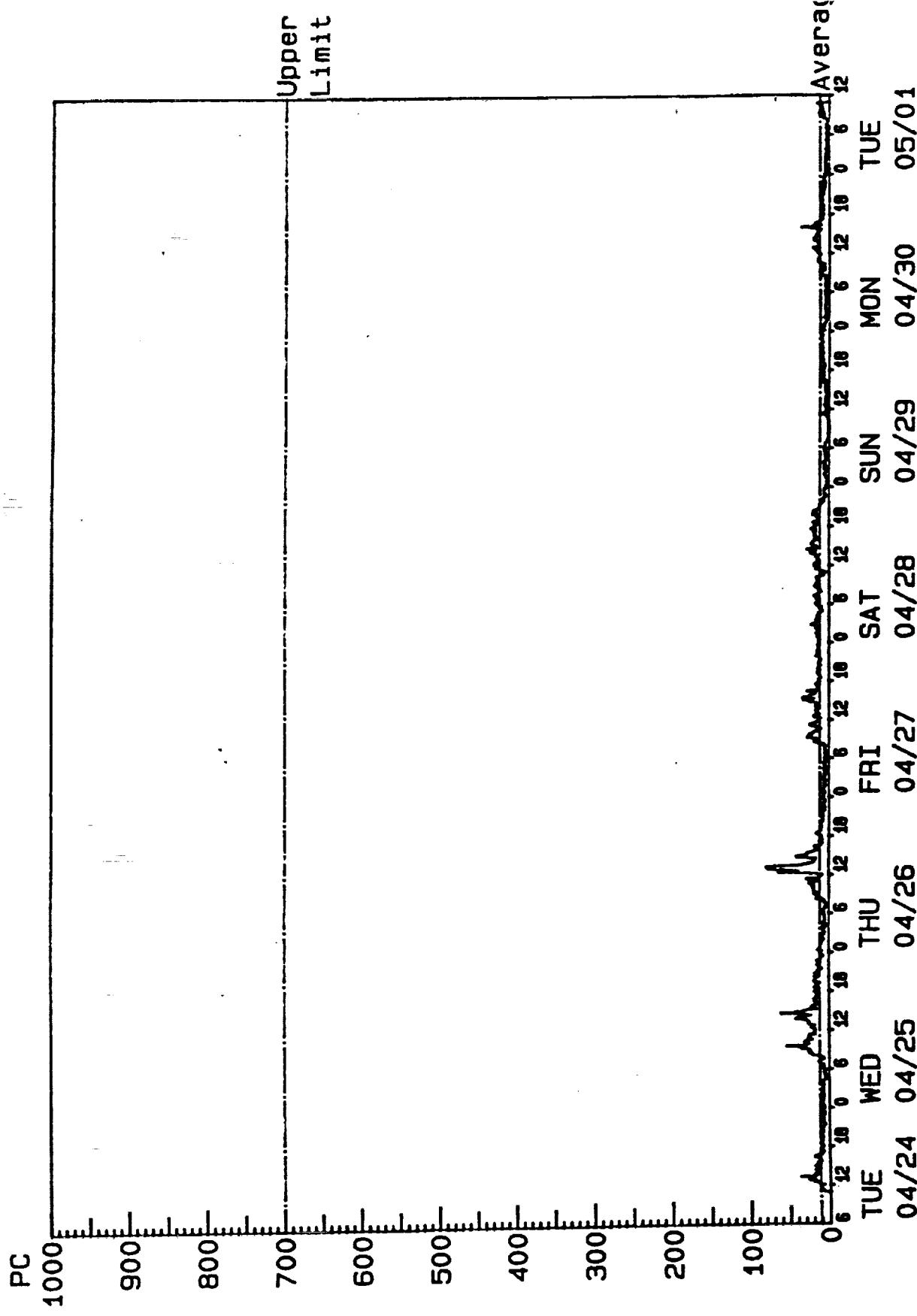
0 . 5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II SITE: HIGH BAY EAST WALL (C01)



5.0 MICRON PARTICLES / CUBIC FT

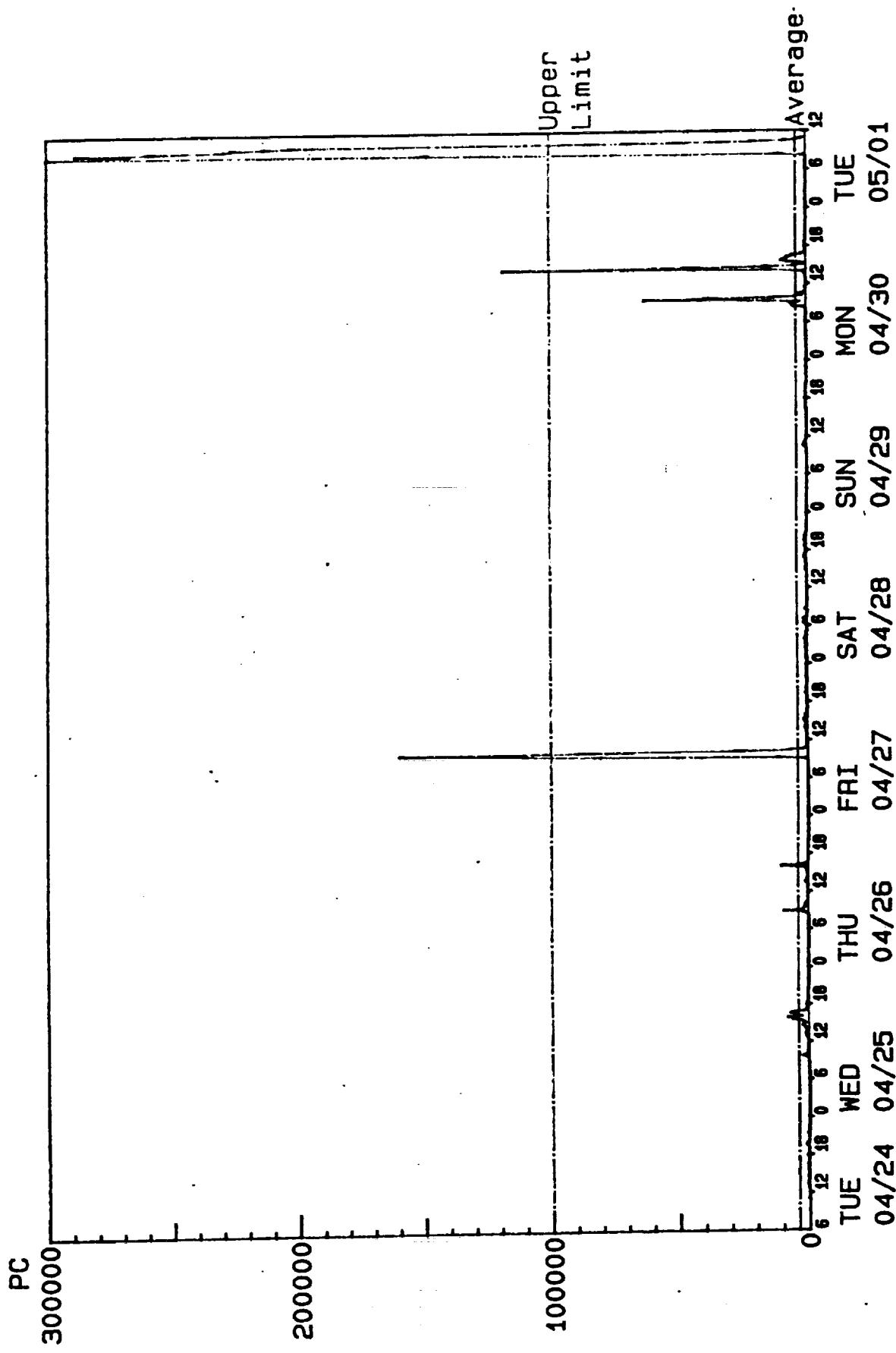
FACILITY: SAEF II SITE: HIGH BAY EAST WALL (CO2)



0.5 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II

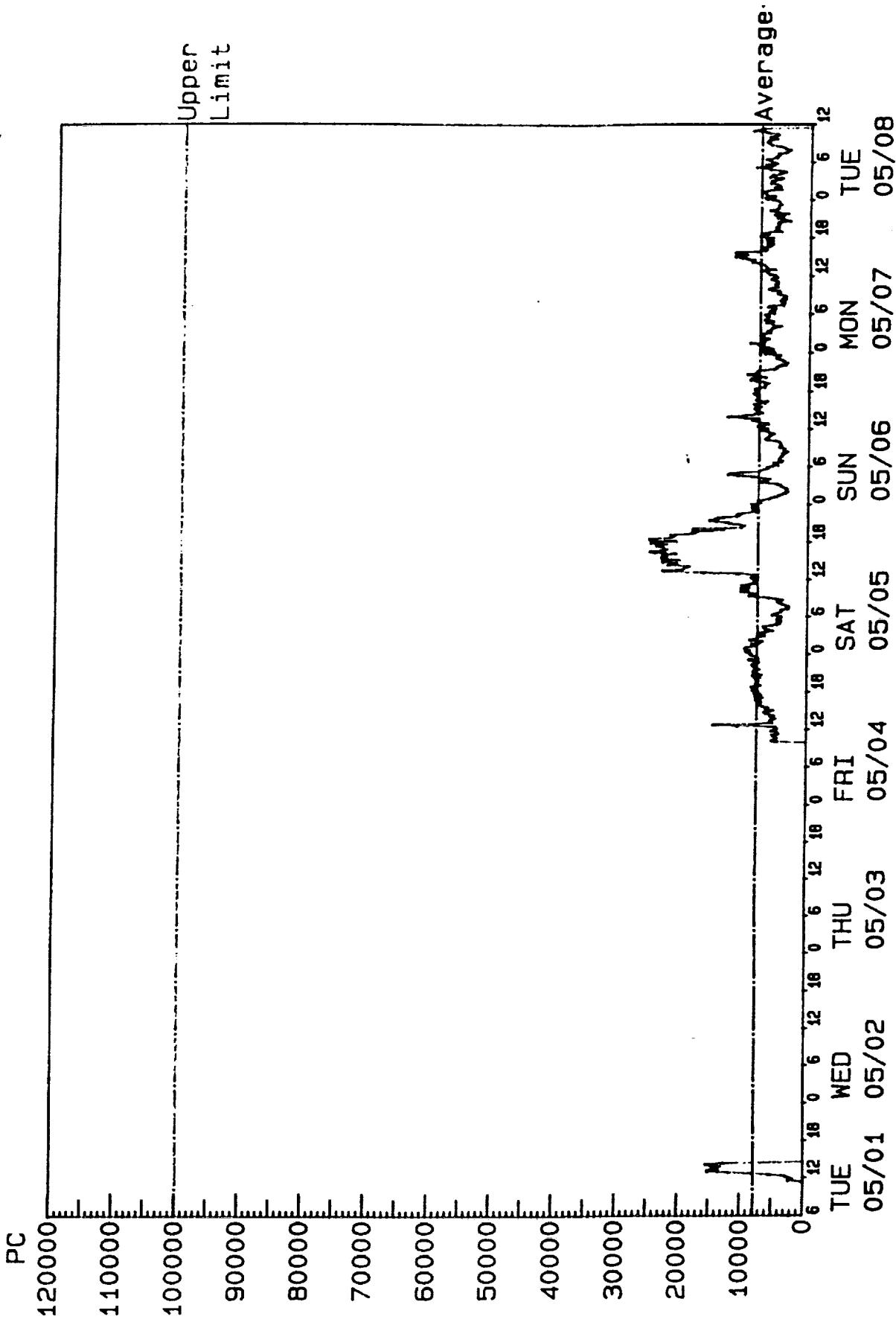
SITE: AIRLOCK EAST WALL (C05)



0.5 MICRON PARTICLES / CUBIC FT

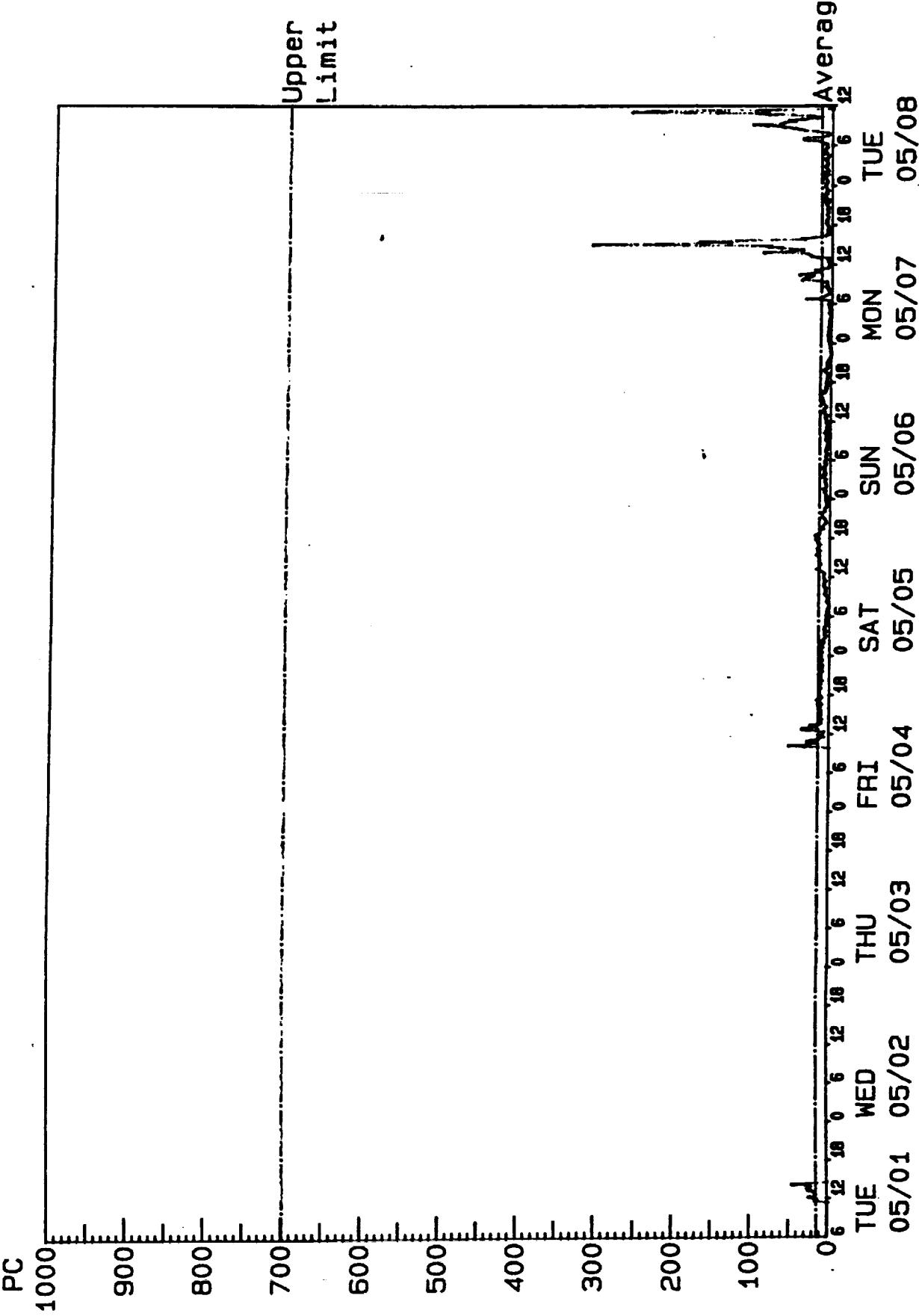
FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C01)



5.0 MICRON PARTICLES / CUBIC FT

FACILITY: SAEF II
SITE: HIGH BAY EAST WALL (CO2)

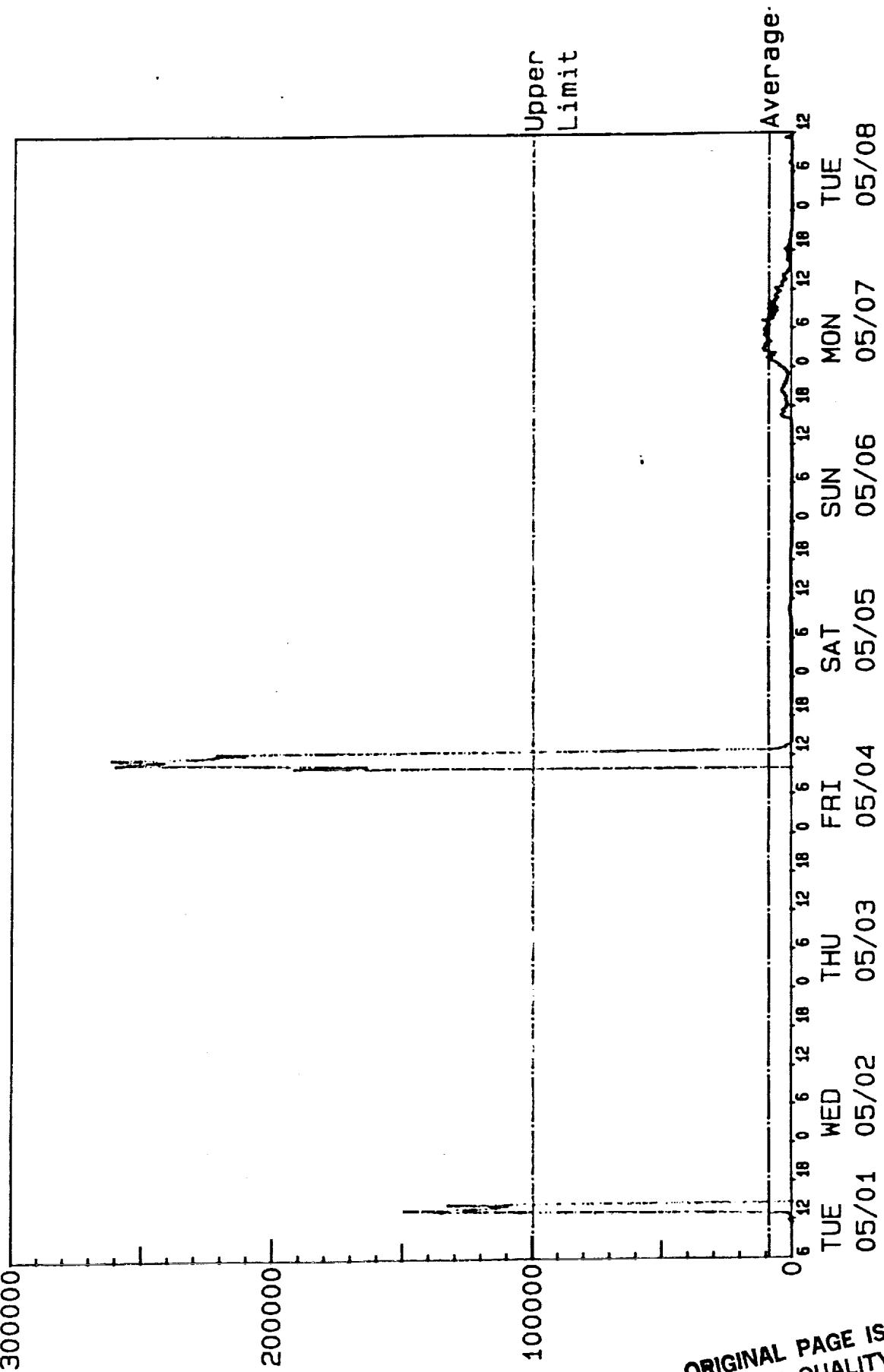


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FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C05)

PC

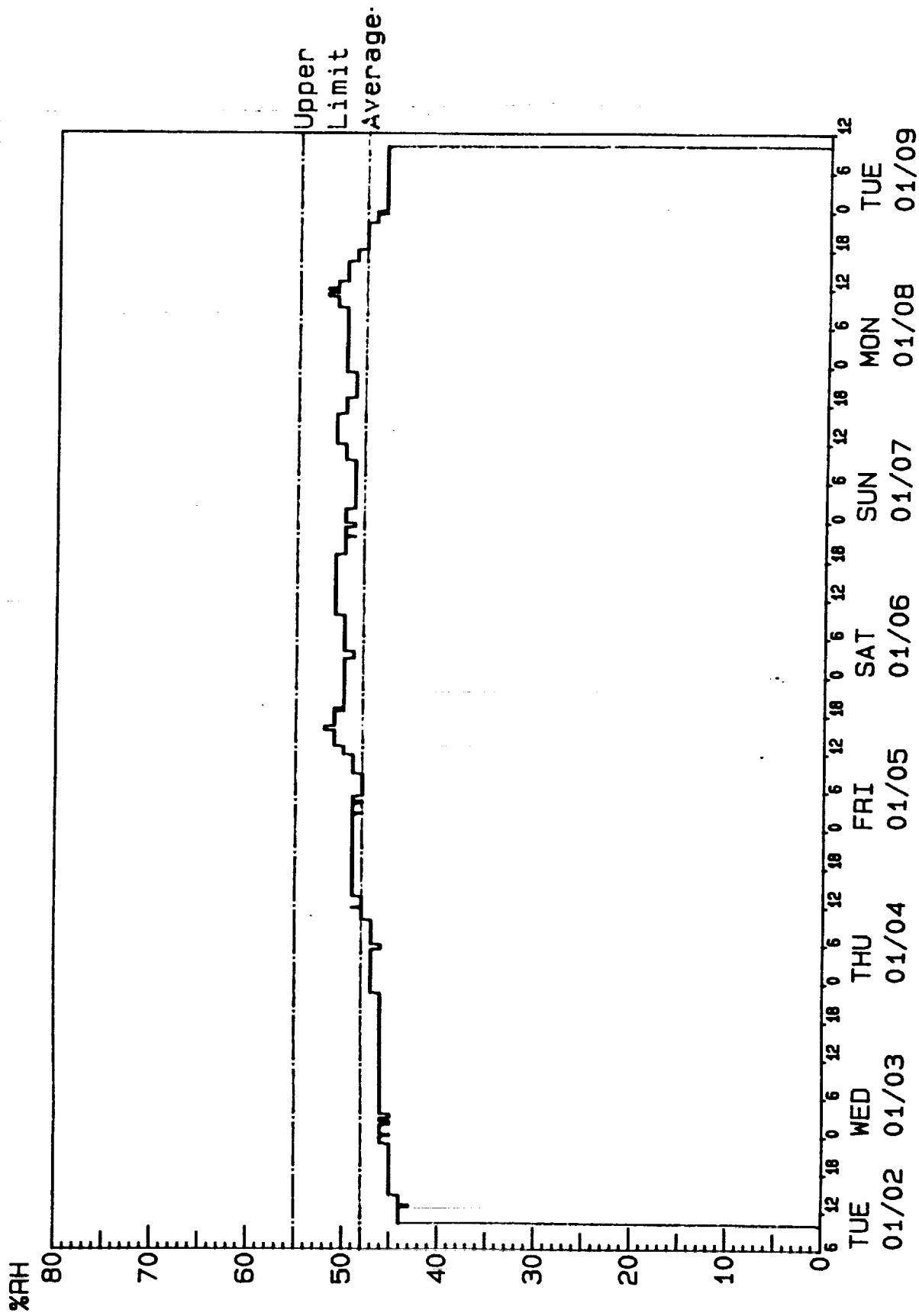


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RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C09)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C14)

%RH

60

Upper
Limit

Average

50

40

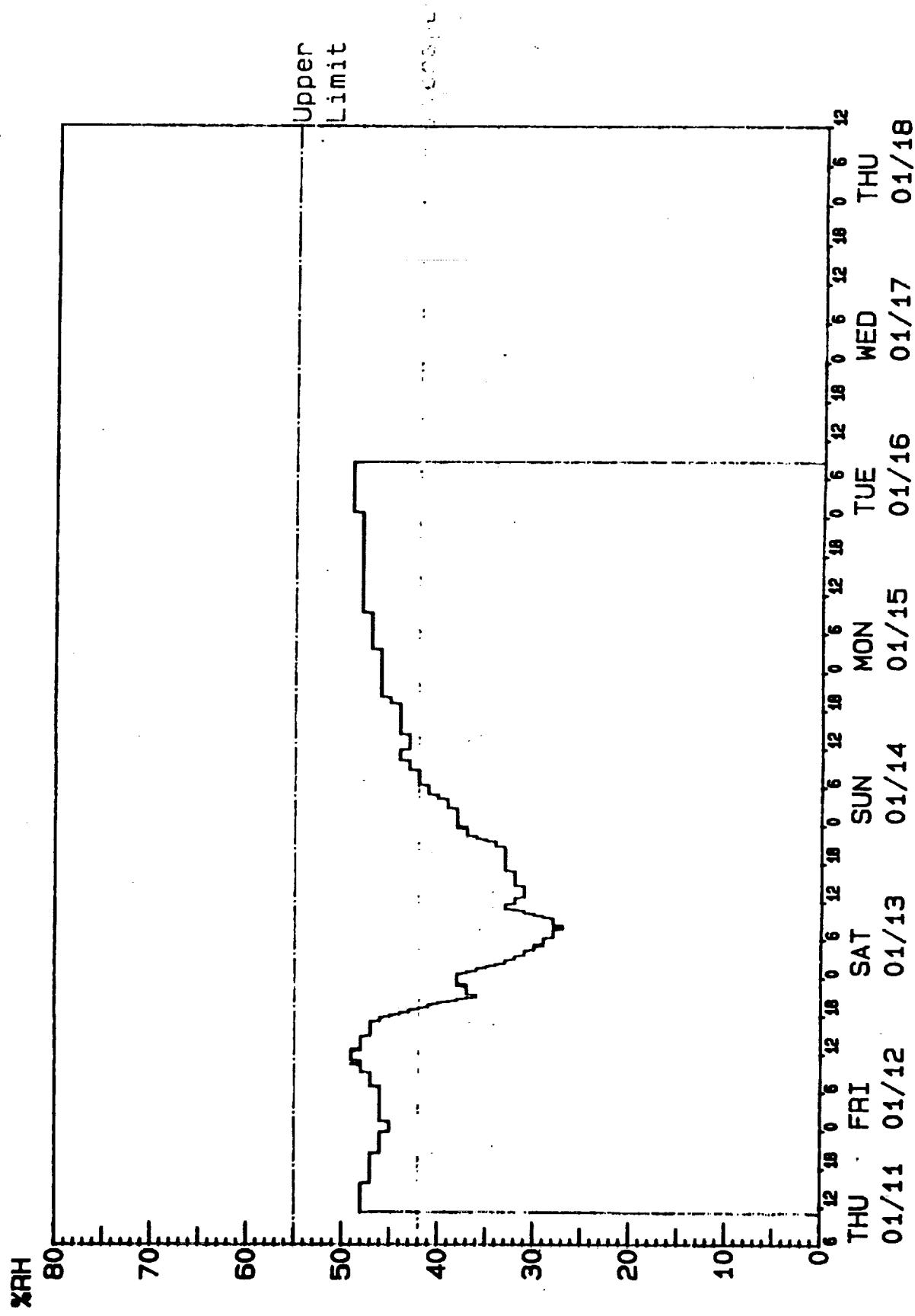
30

Time	Day	Month	Year
06:00	TUE	01/02	01/03
12:00	WED	01/03	01/04
06:00	THU	01/04	01/05
12:00	FRI	01/05	01/06
06:00	SAT	01/06	01/07
12:00	SUN	01/07	01/08
06:00	MON	01/08	01/09
12:00	TUE	01/09	01/09

RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

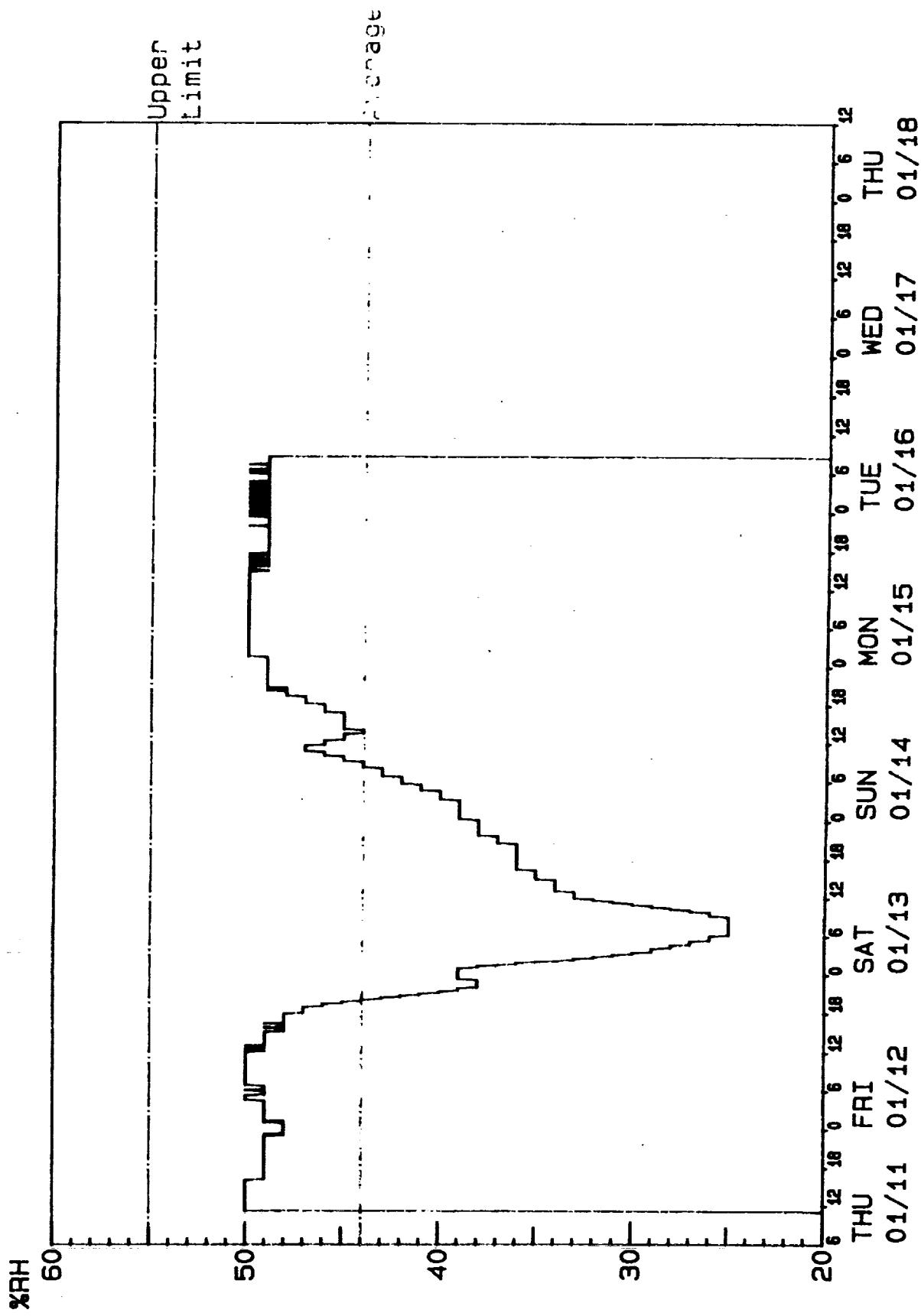
SITE: HIGH BAY EAST WALL (C09)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF III

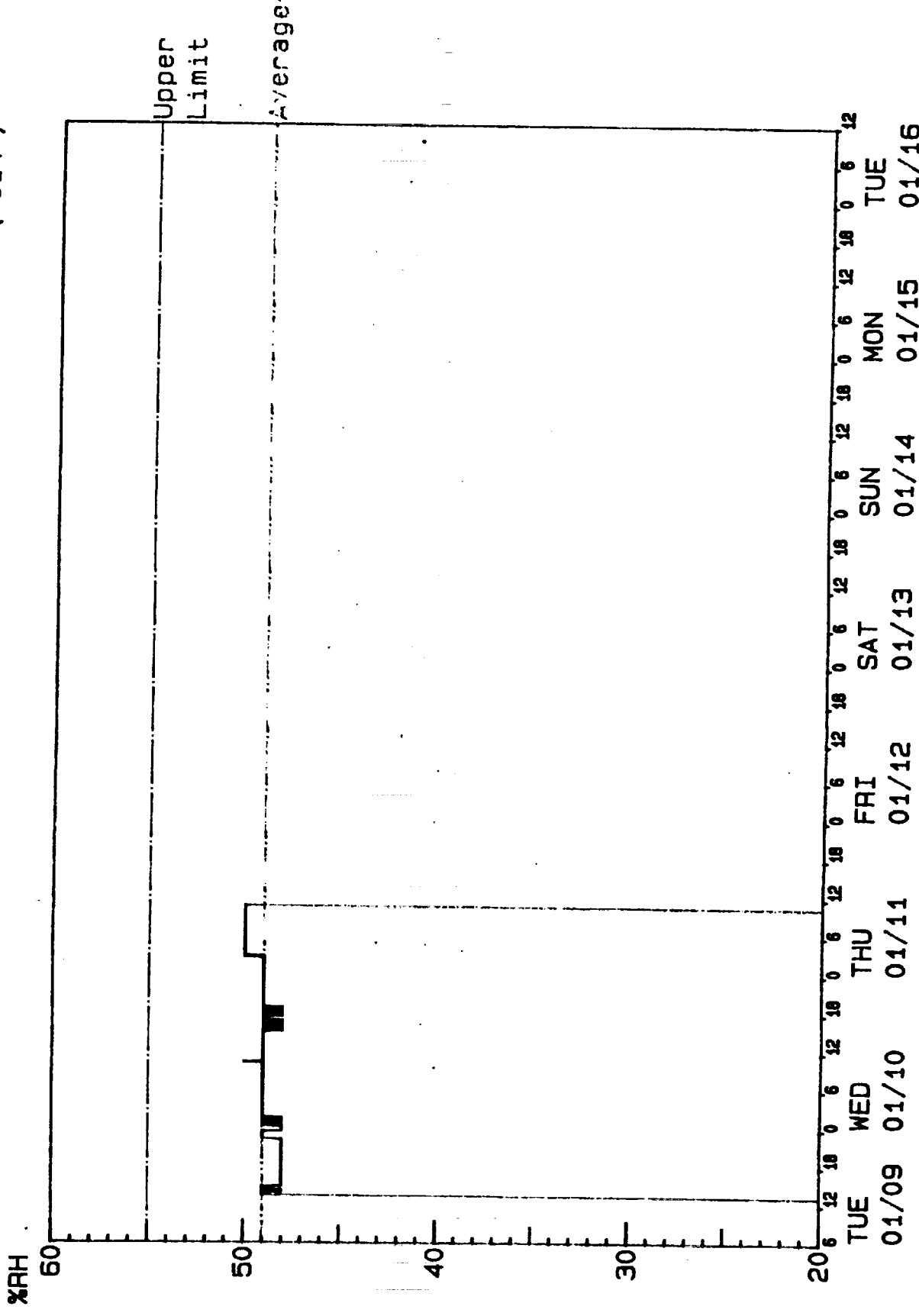
SITE: AIRLOCK EAST WALL (C14)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

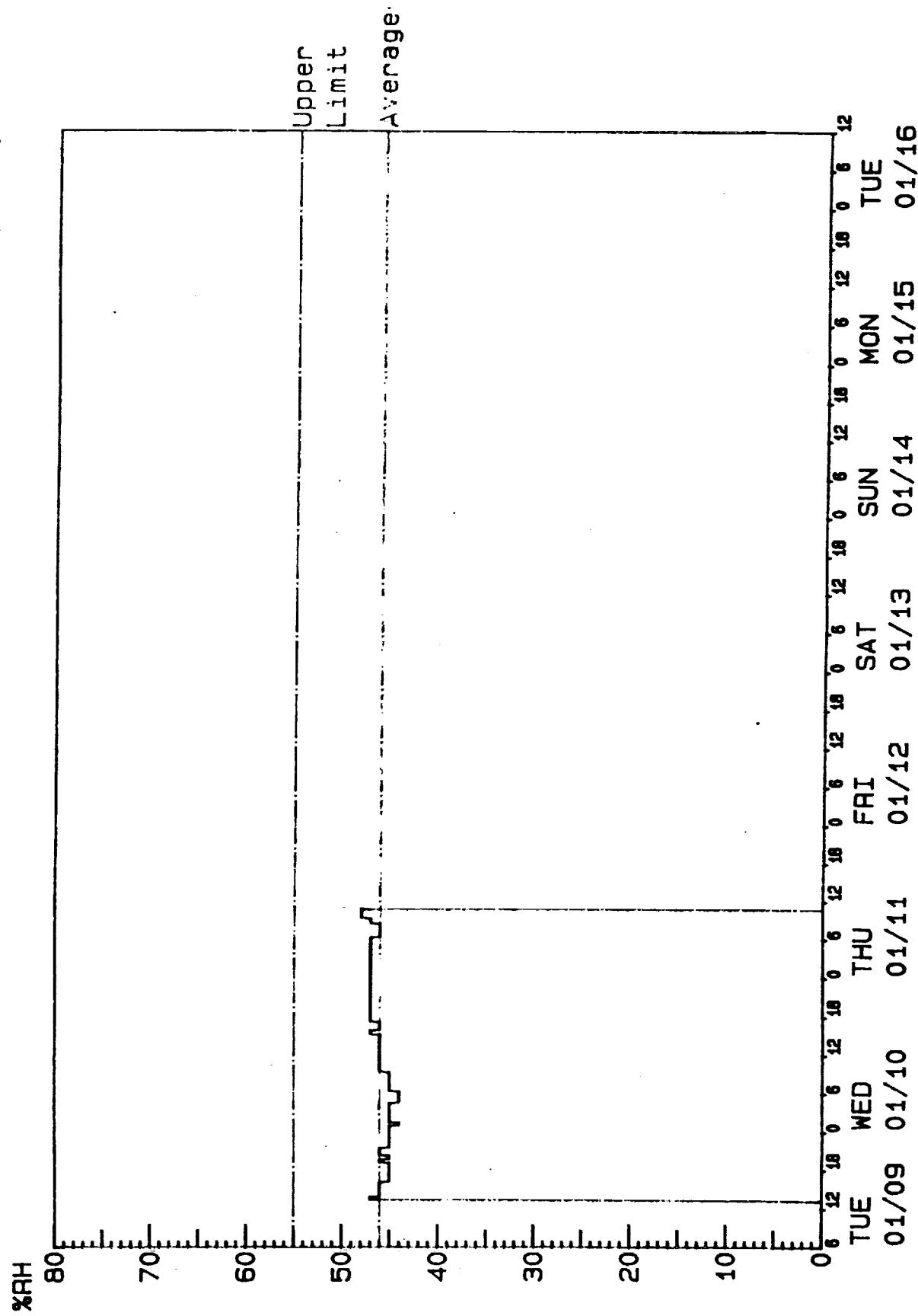
SITE: AIRLOCK EAST WALL (C14)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

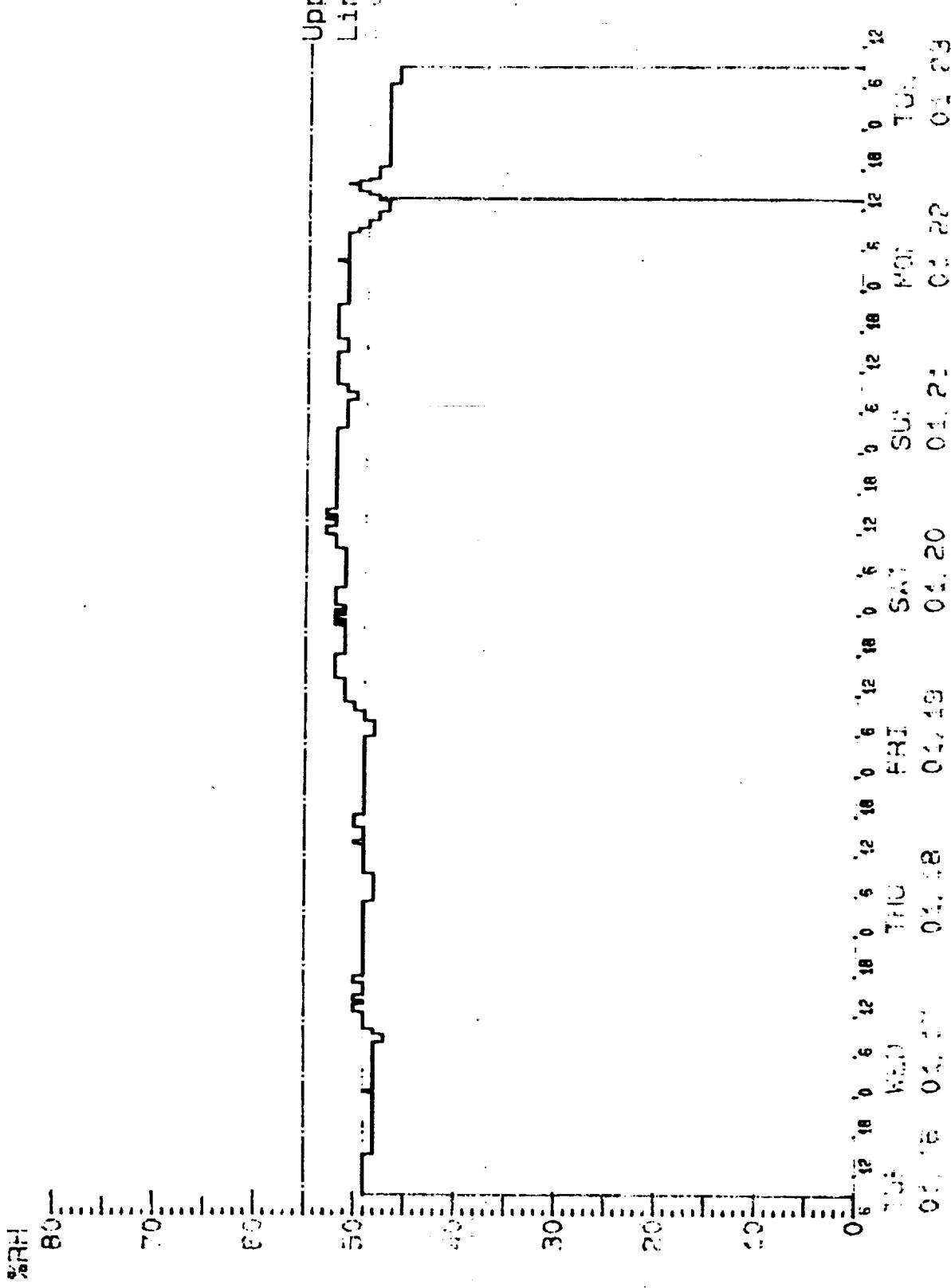
SITE: HIGH BAY EAST WALL (C09)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

SITE: HEG. BAY LAST KNOT (CO9)

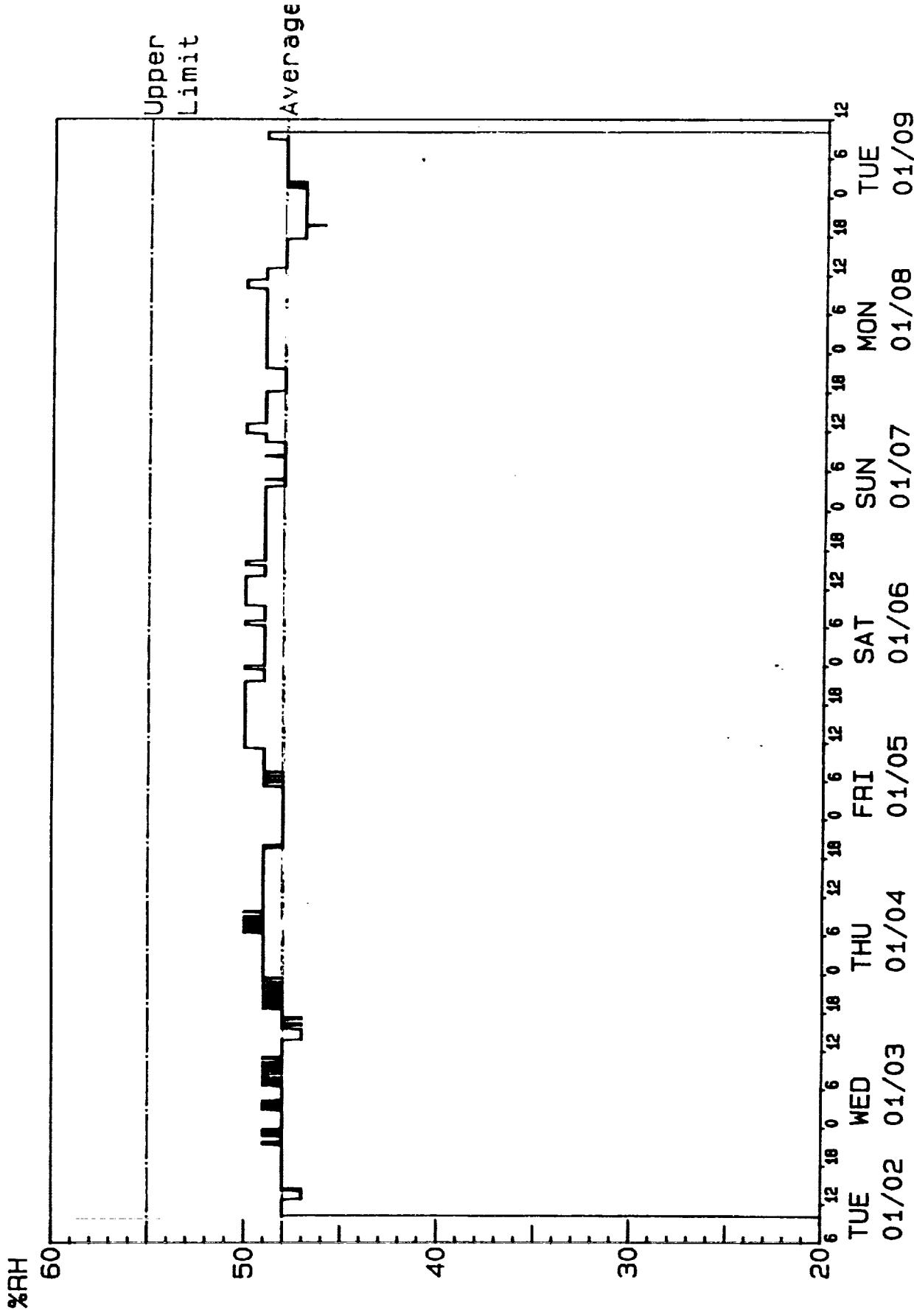


ORIGINAL PAGE IS
OF POOR QUALITY

RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

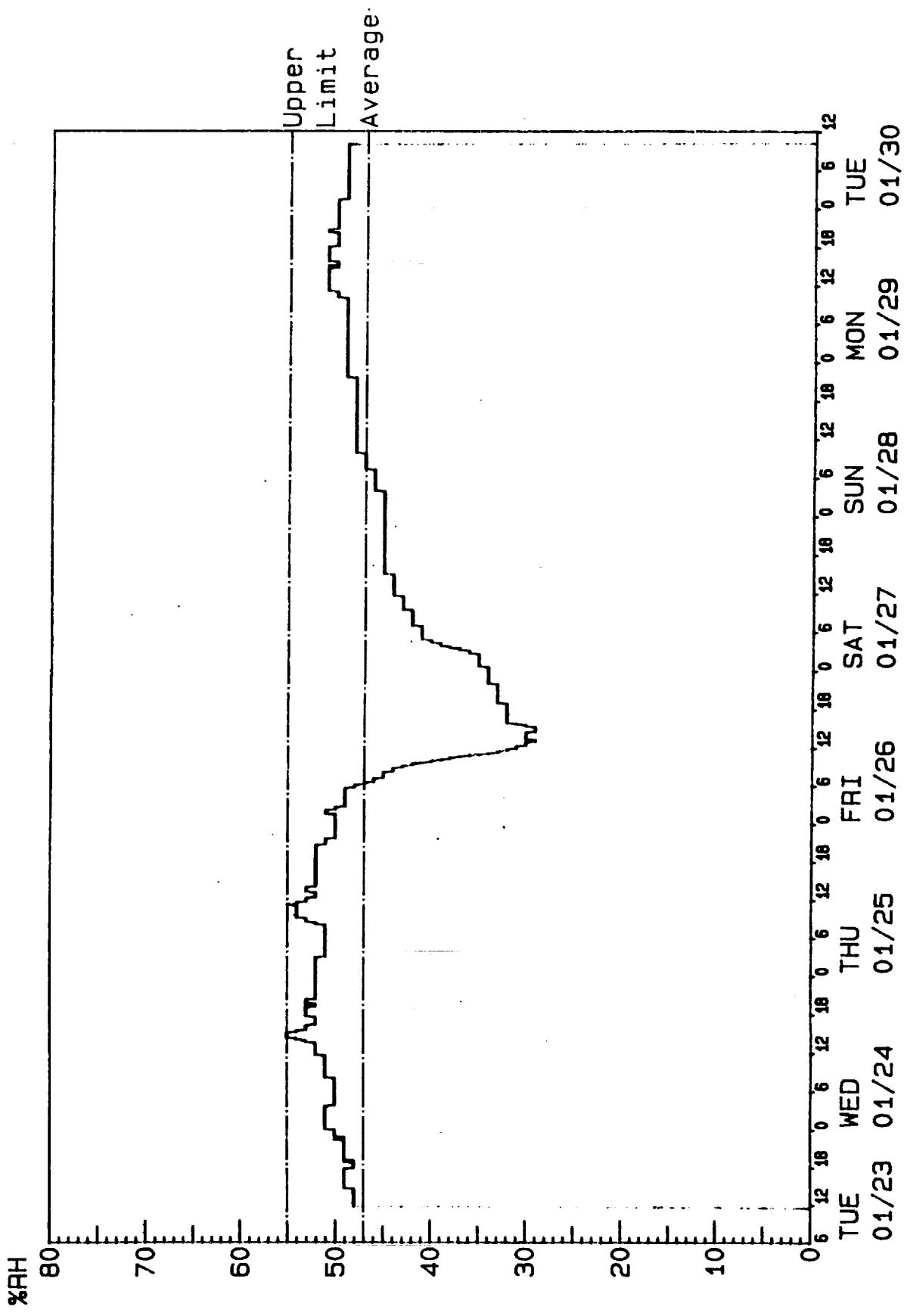
SITE: AIRLOCK EAST WALL (C14)



ORIGINAL PAGE IS
OF POOR QUALITY

RELATIVE HUMIDITY VS TIME

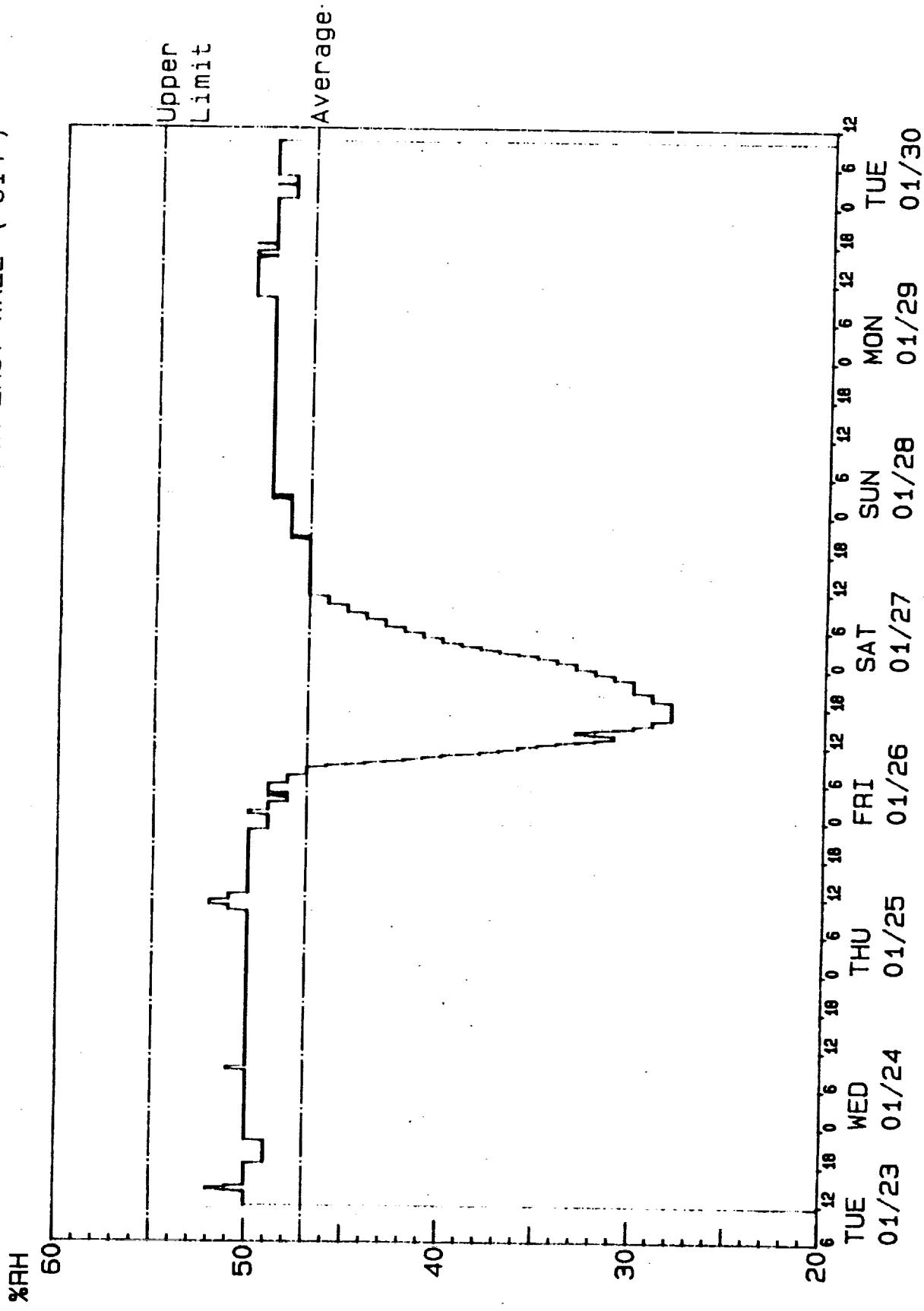
FACILITY: SAEF II SITE: HIGH BAY EAST WALL (C09)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

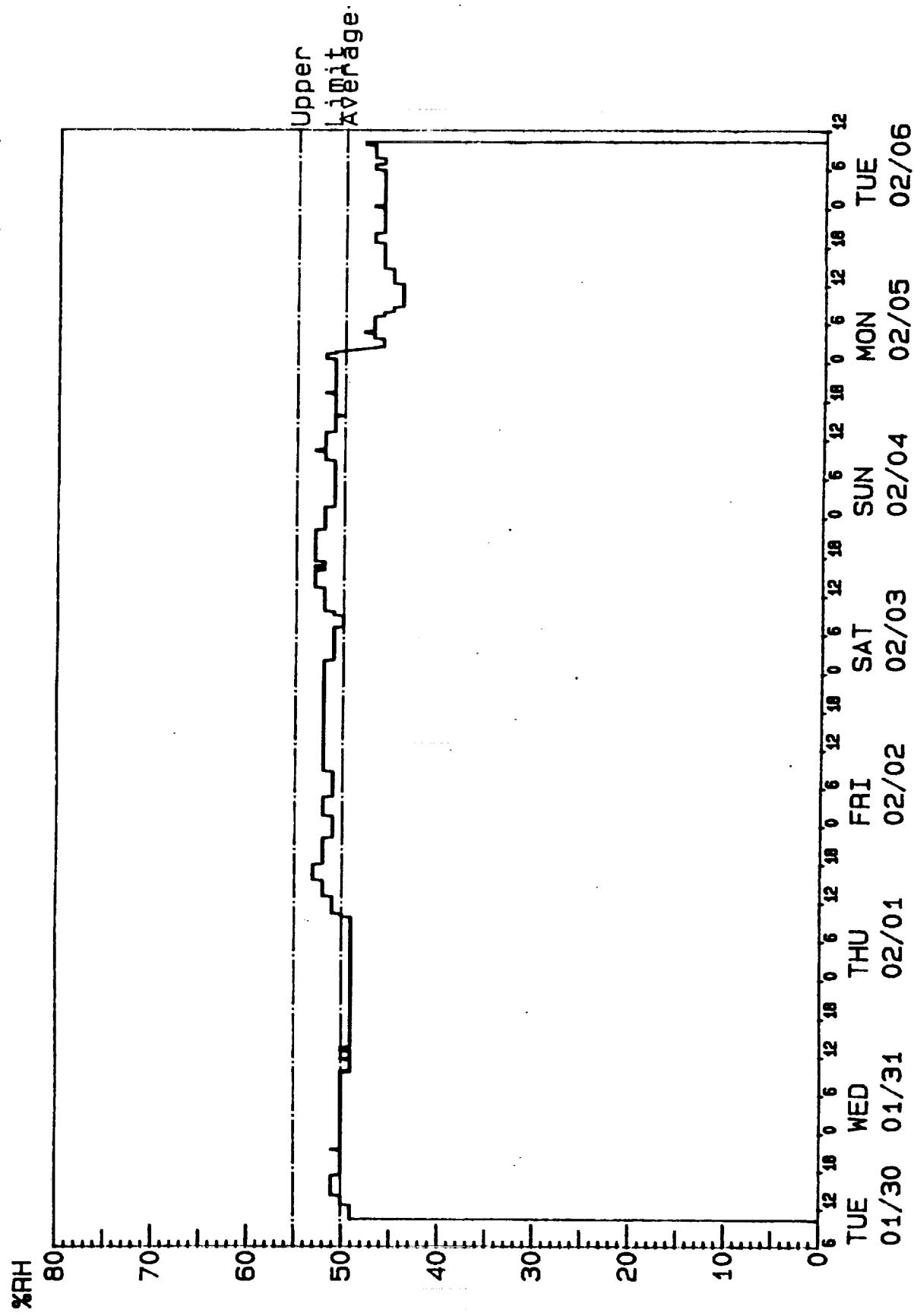
SITE: AIRLOCK EAST WALL (C14)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

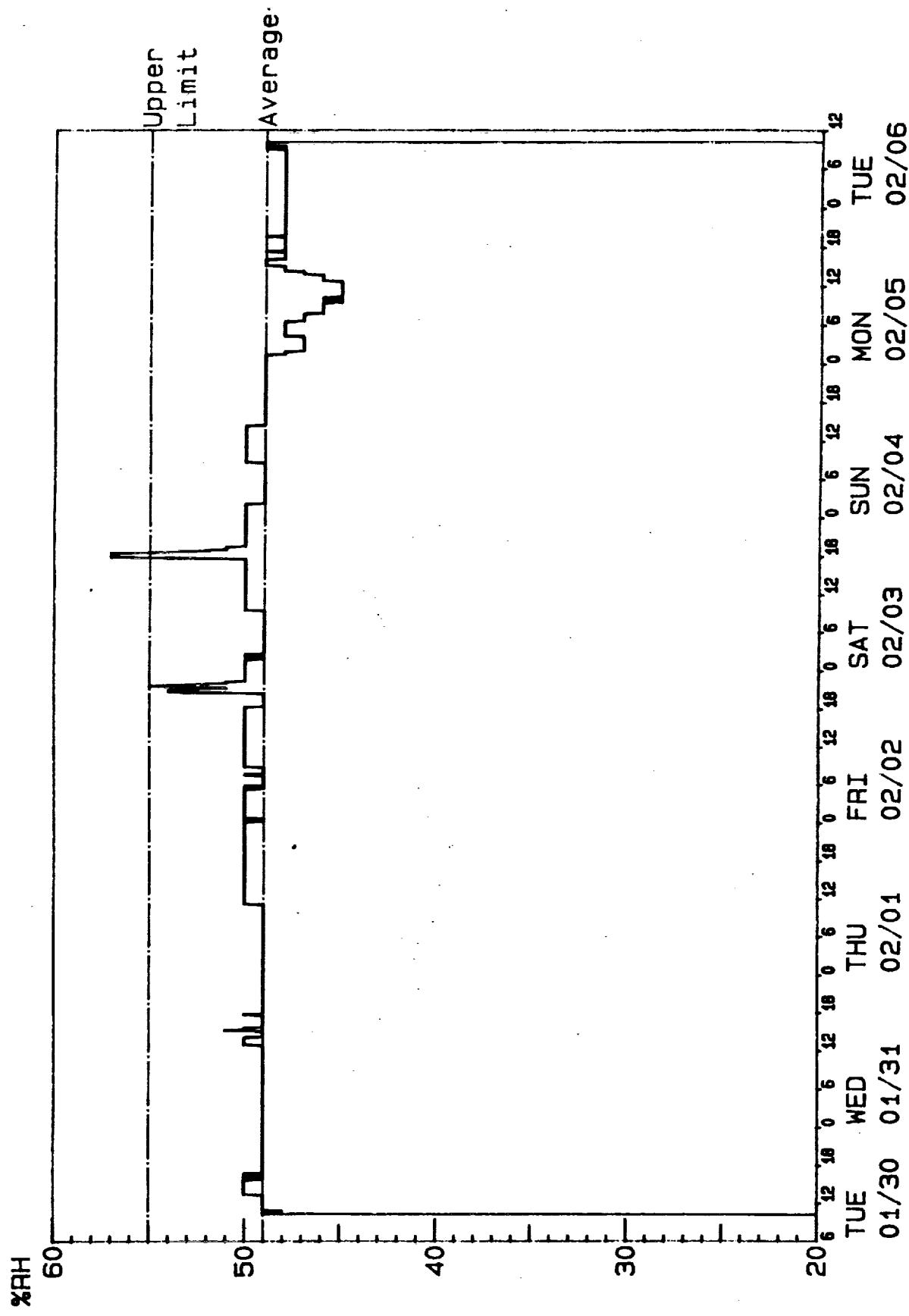
SITE: HIGH BAY EAST WALL (C09)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

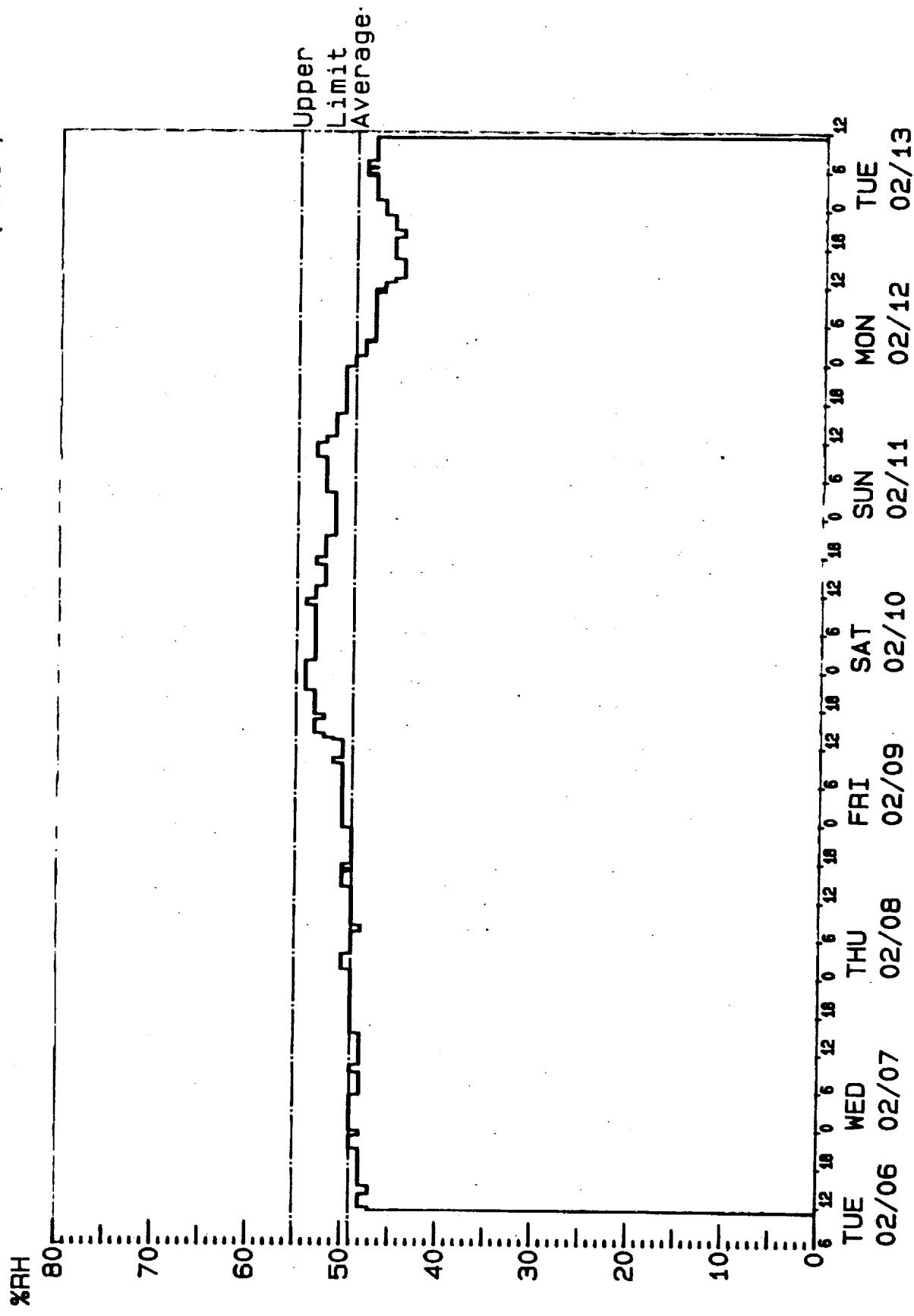
SITE: AIRLOCK EAST WALL (C14)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

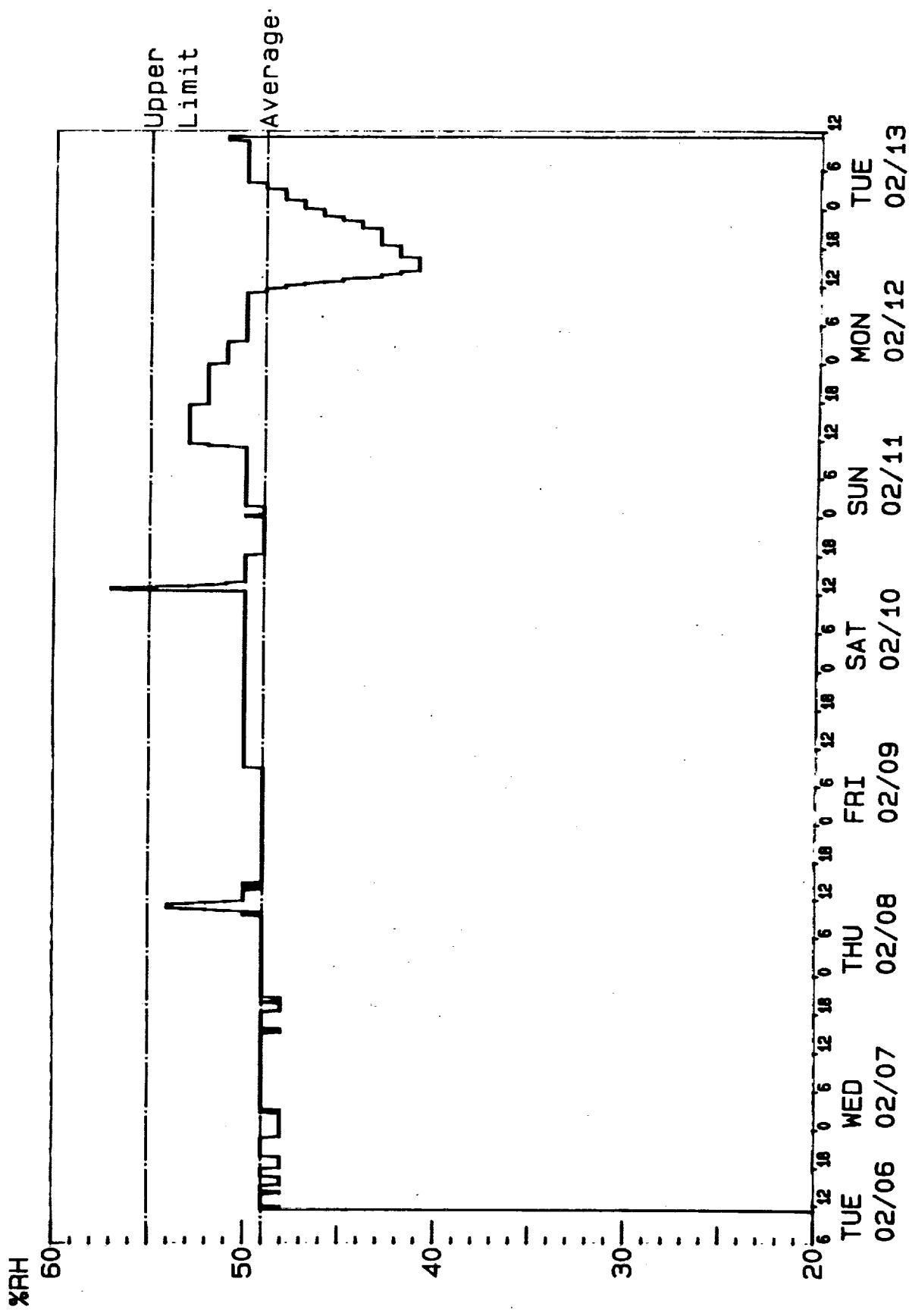
SITE: HIGH BAY EAST WALL (C09)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

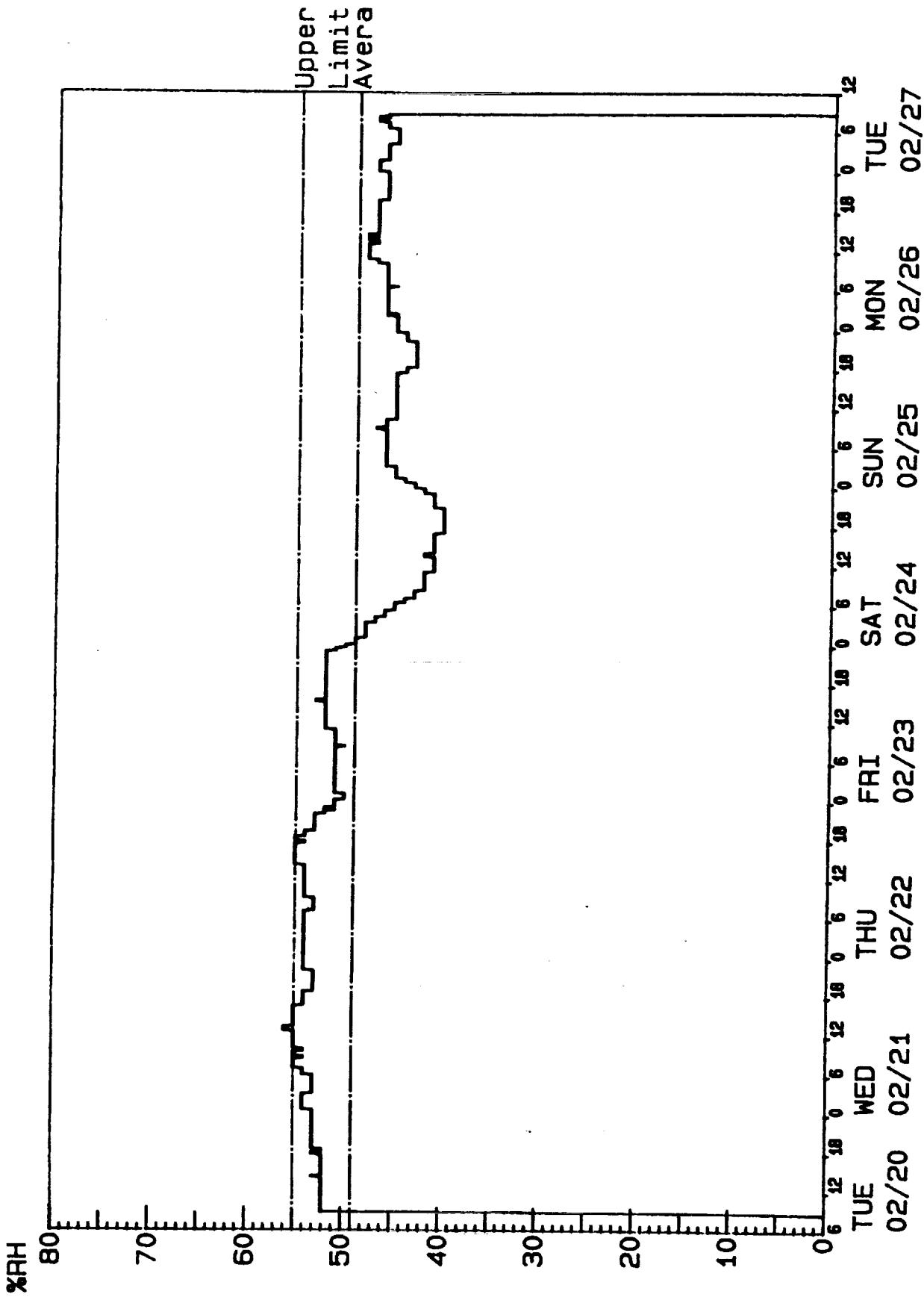
SITE: AIRLOCK EAST WALL (C14)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

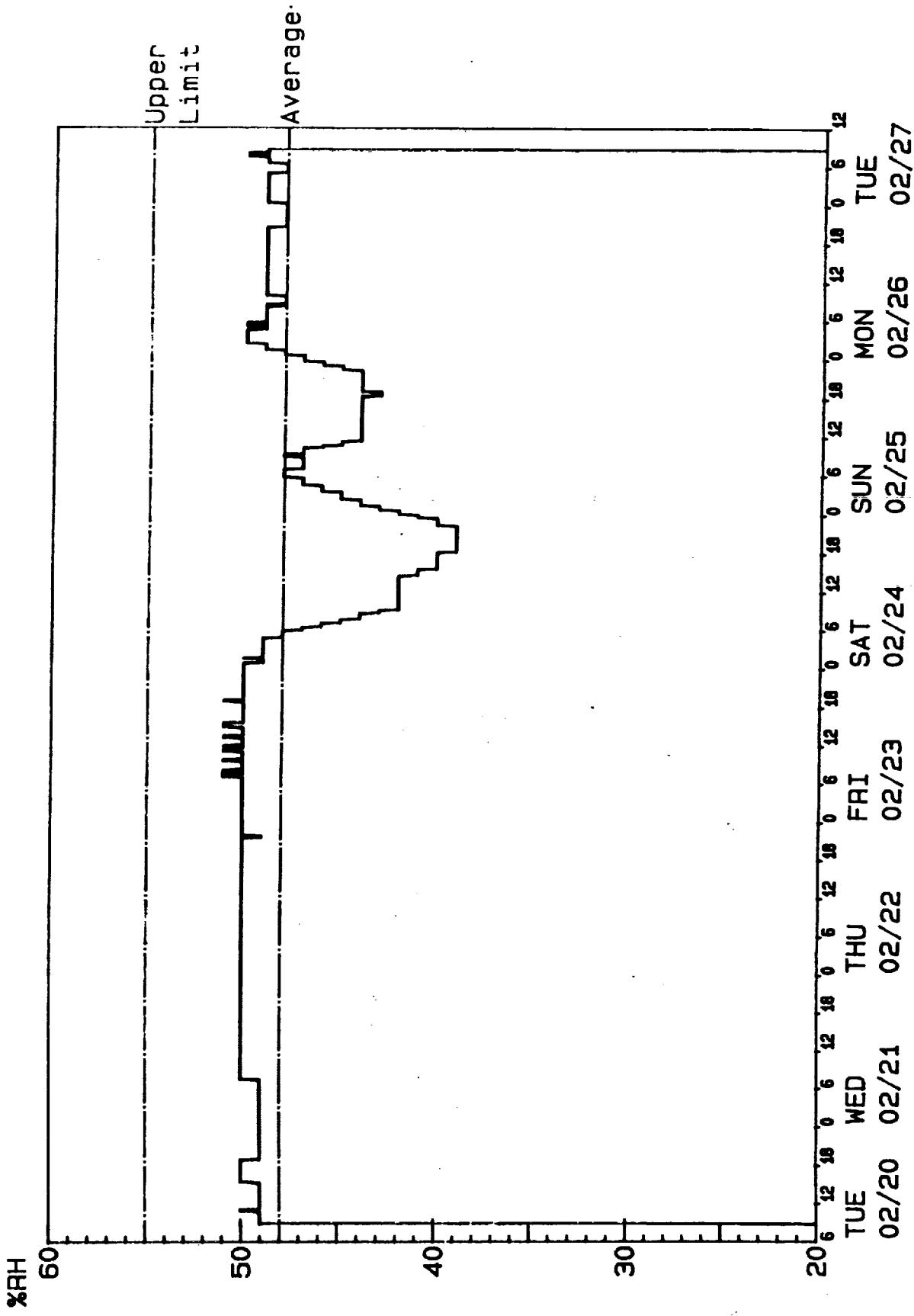
SITE: HIGH BAY EAST WALL (CO9)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

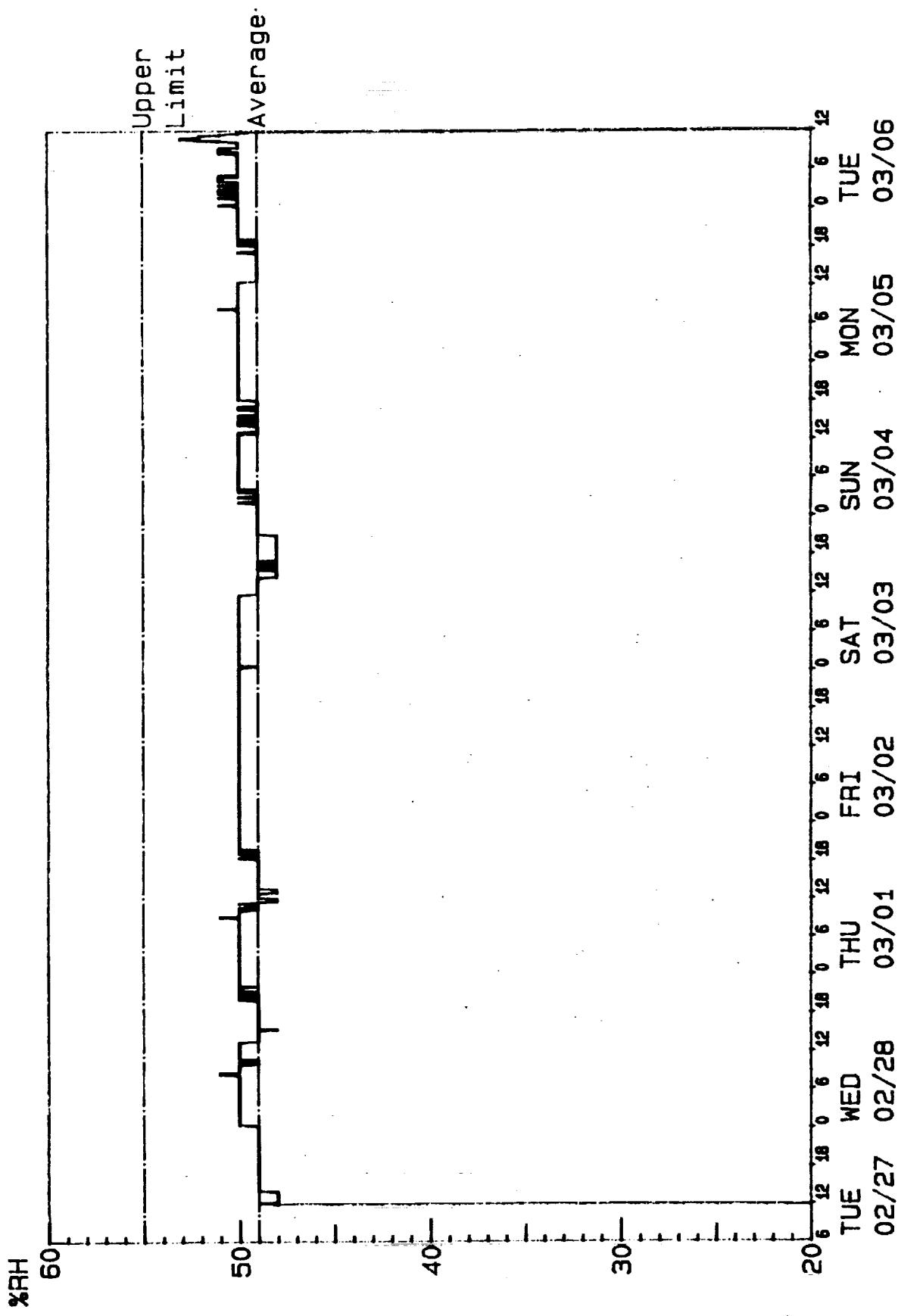
SITE: AIRLOCK EAST WALL (C14)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C14)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C09)

%RH

80

70

60

50

40

30

20

10

0

Upper
Limit

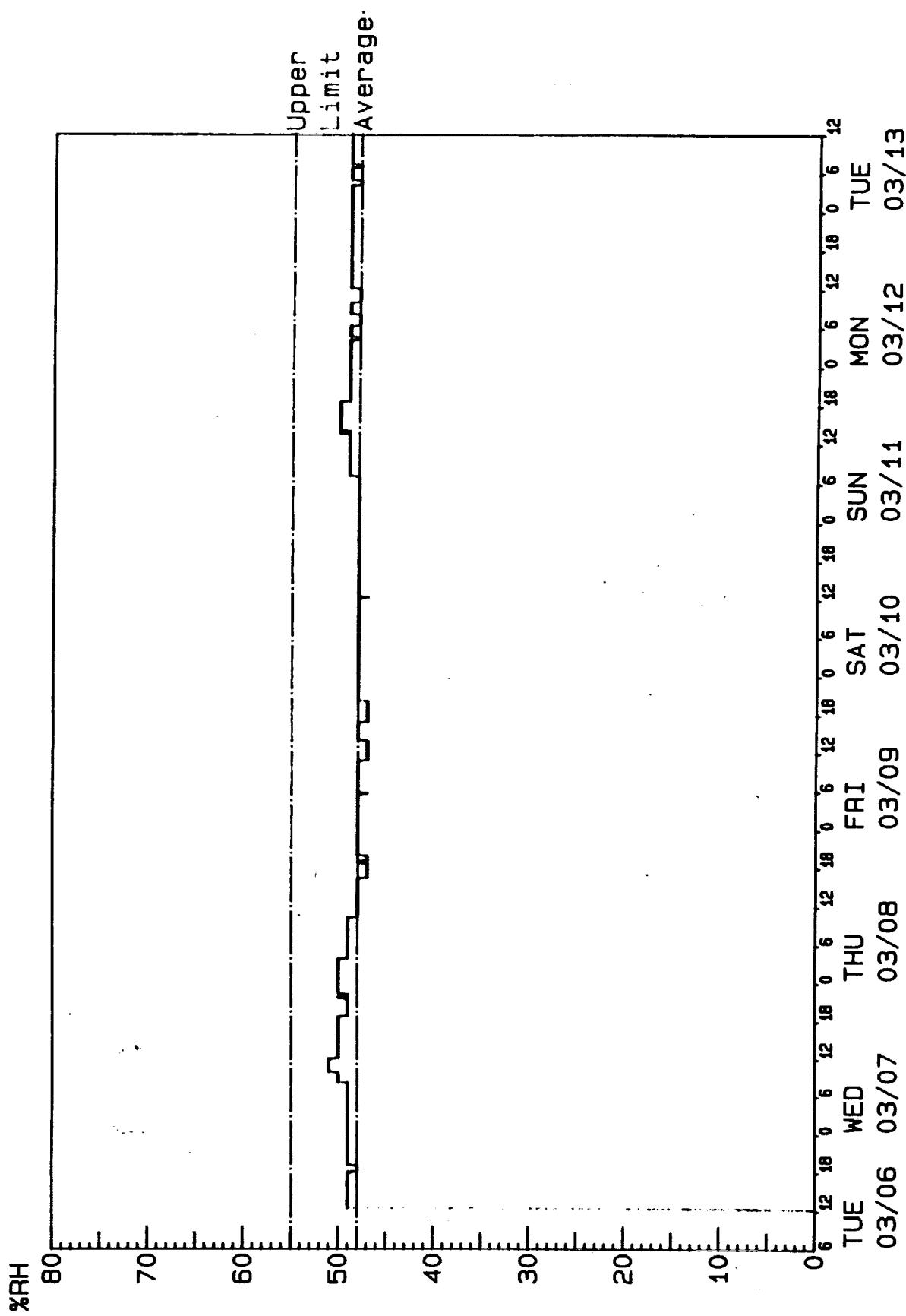
Average

Time	TUE 02/27	WED 02/28	THU 03/01	FRI 03/02	SAT 03/03	SUN 03/04	MON 03/05	TUE 03/06
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06:15	10	8	4	4	10	8	4	10
06:30	8	6	3	3	8	6	3	8
06:45	6	4	2	2	6	4	2	6
07:00	4	2	1	1	4	2	1	4
07:15	2	1	0	0	2	1	0	2
07:30	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0
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48:30	0	0	0	0	0	0	0	0
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49:00	0	0	0					

RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

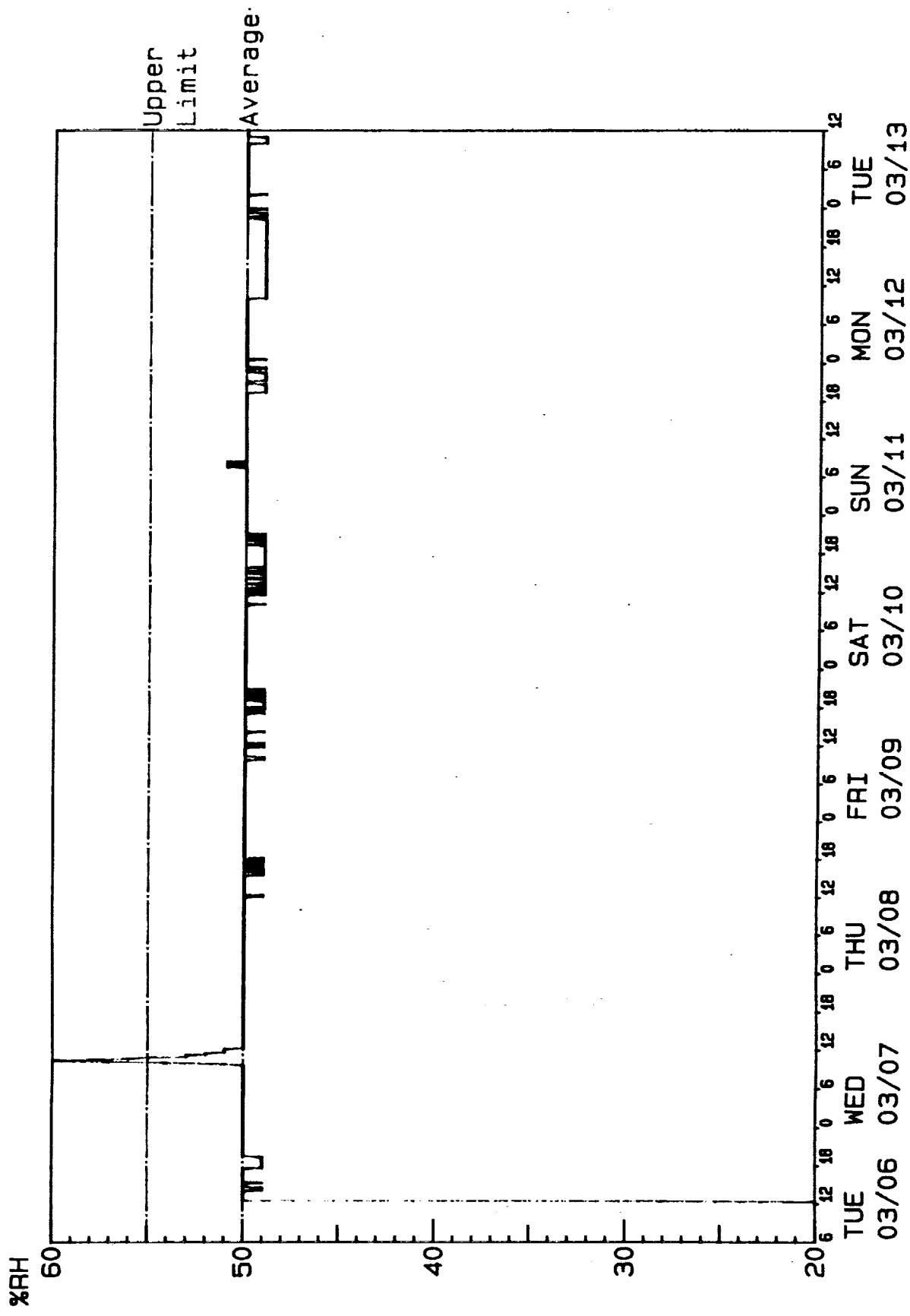
SITE: HIGH BAY EAST WALL (C09)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

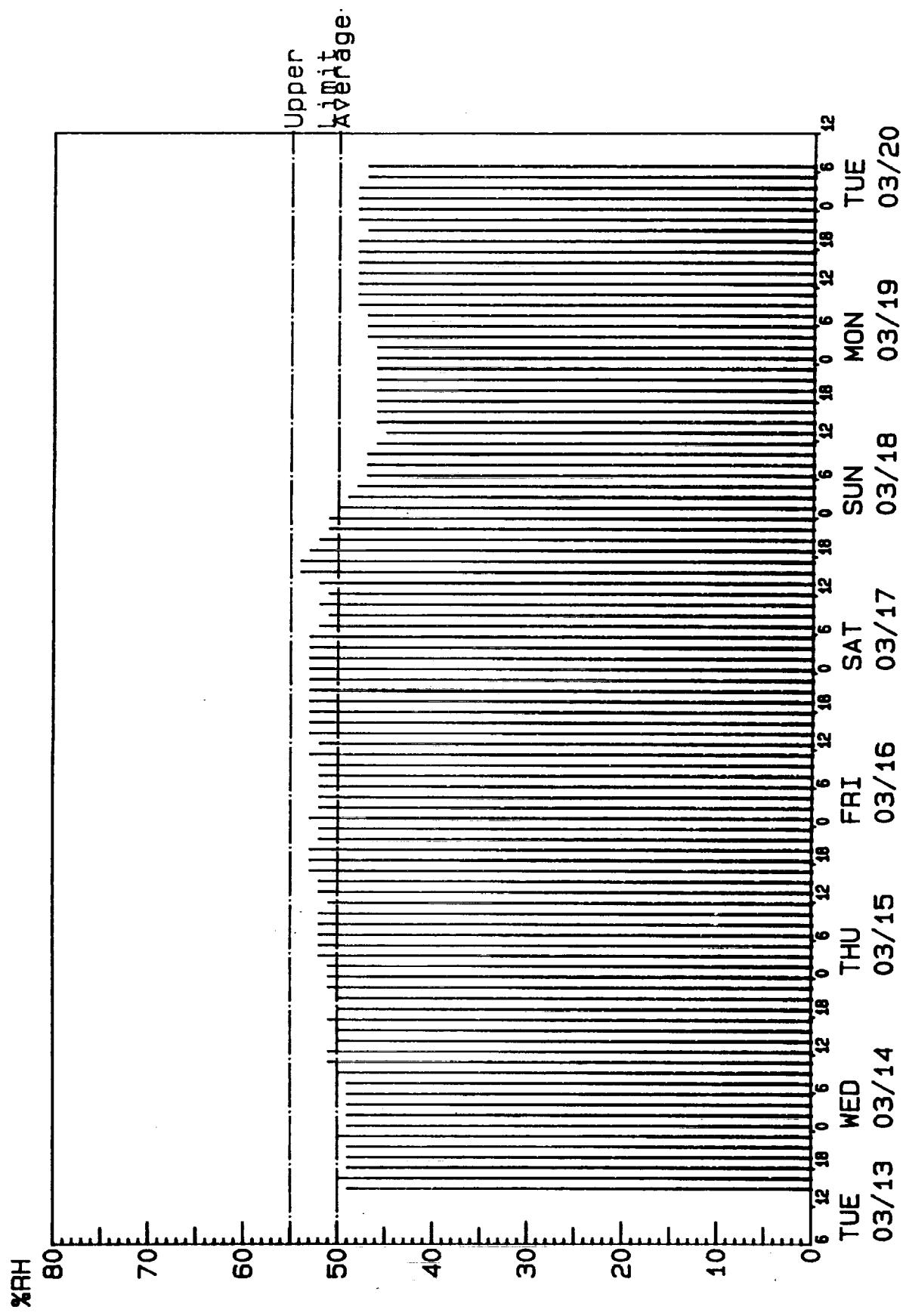
SITE: AIRLOCK EAST WALL (C14)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

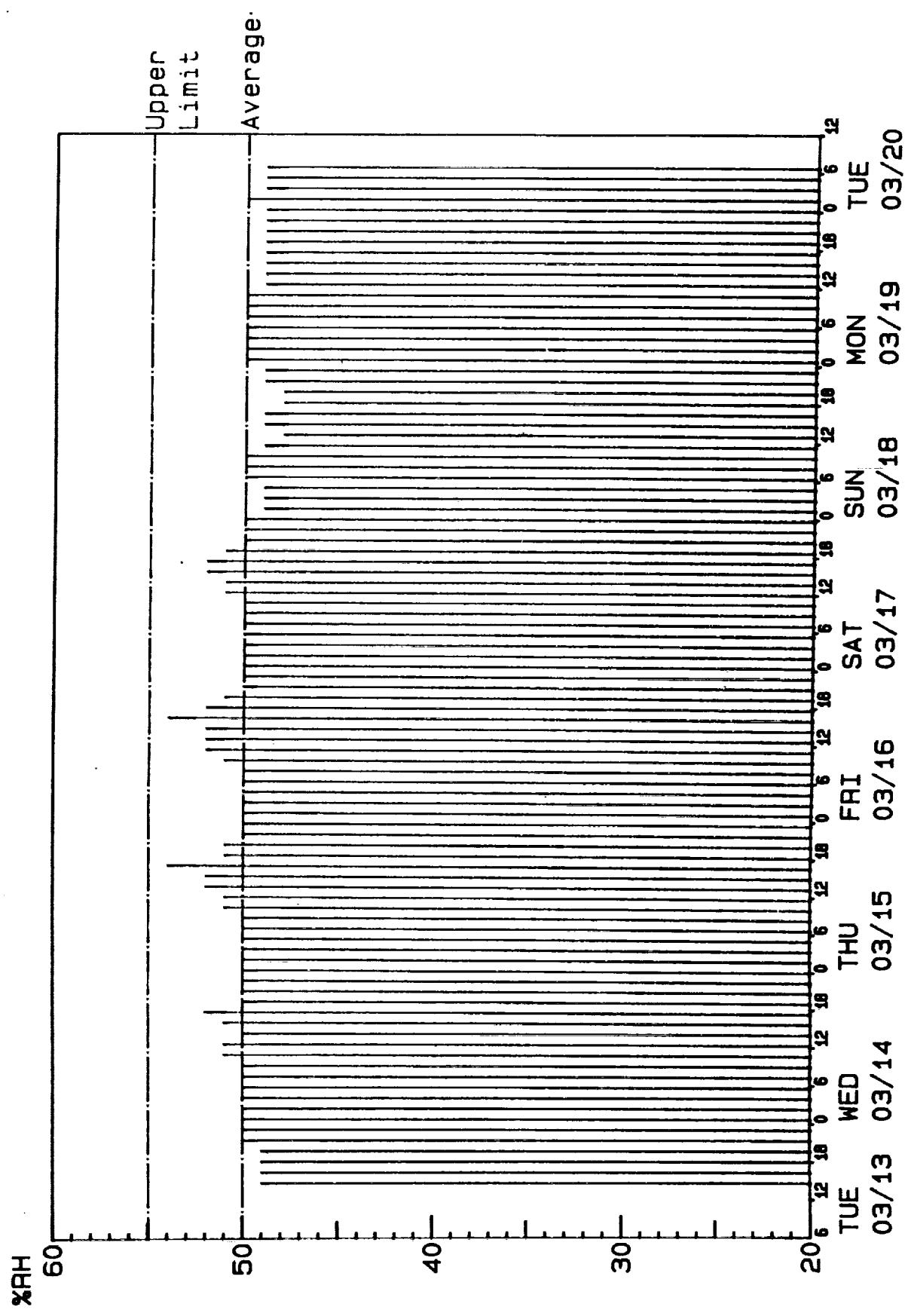
SITE: HIGH BAY EAST WALL (C09)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

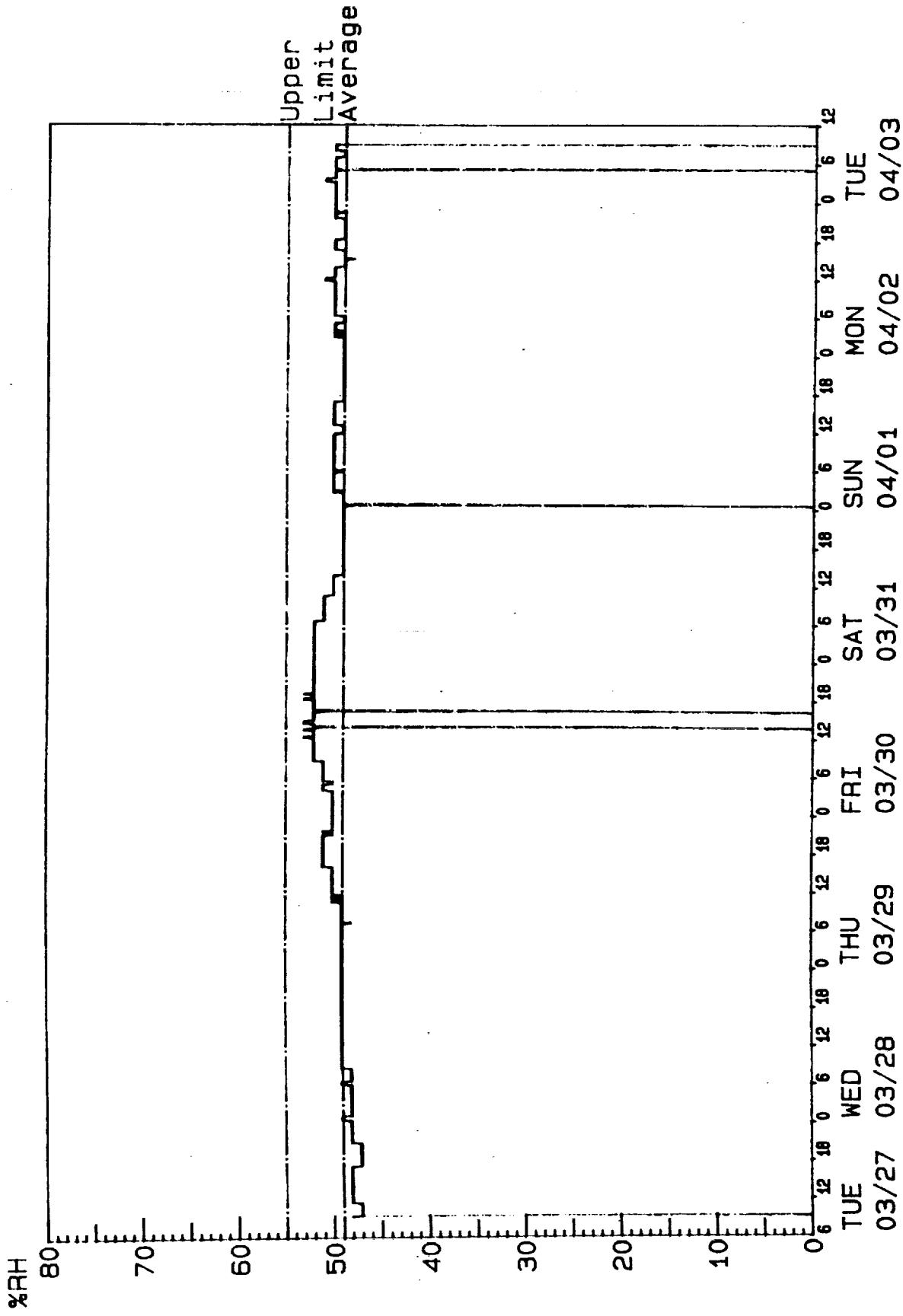
SITE: AIRLOCK EAST WALL (C14)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

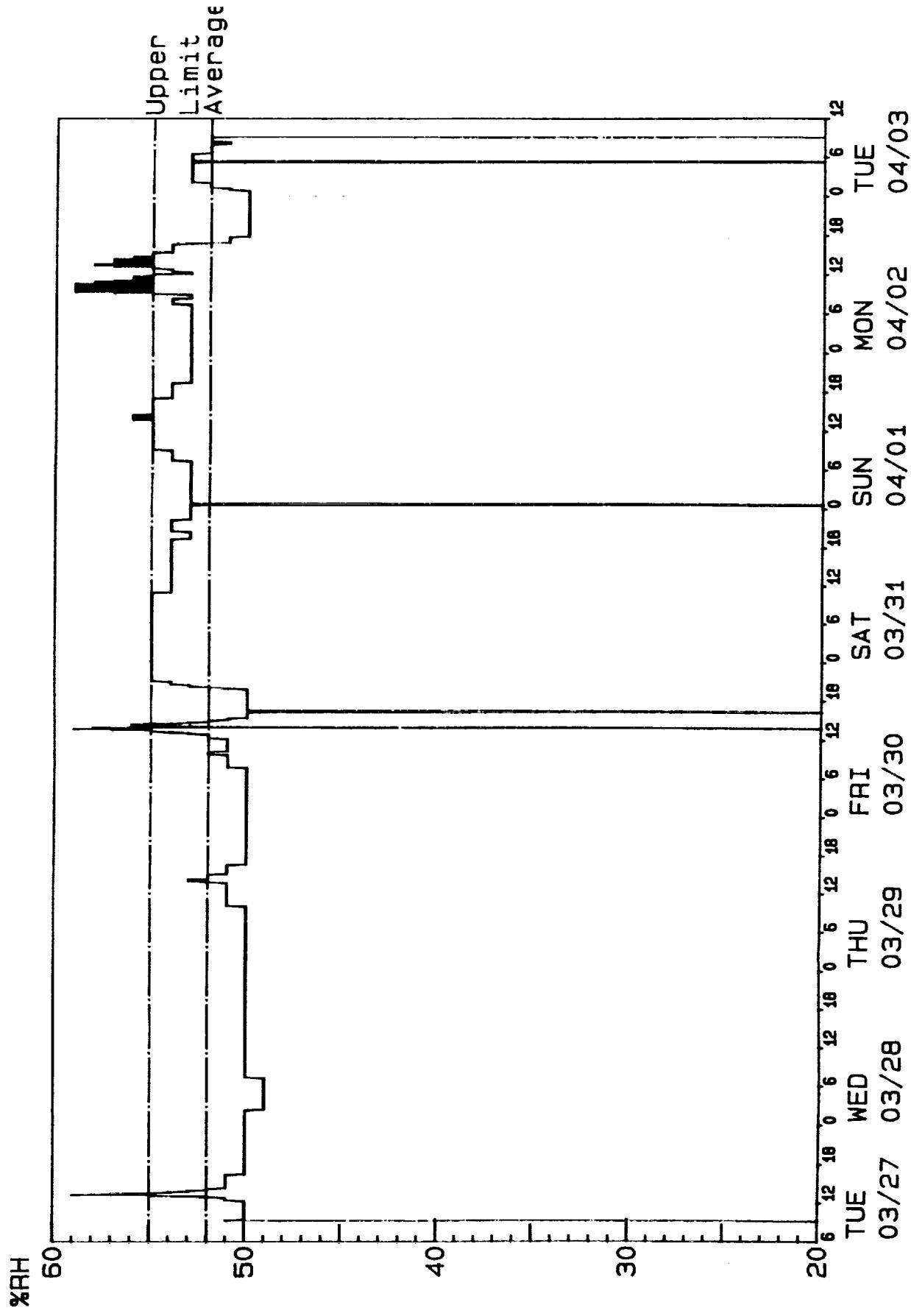
SITE: HIGH BAY EAST WALL (C09)



INITIAL MEDIUM VALUE

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C14)

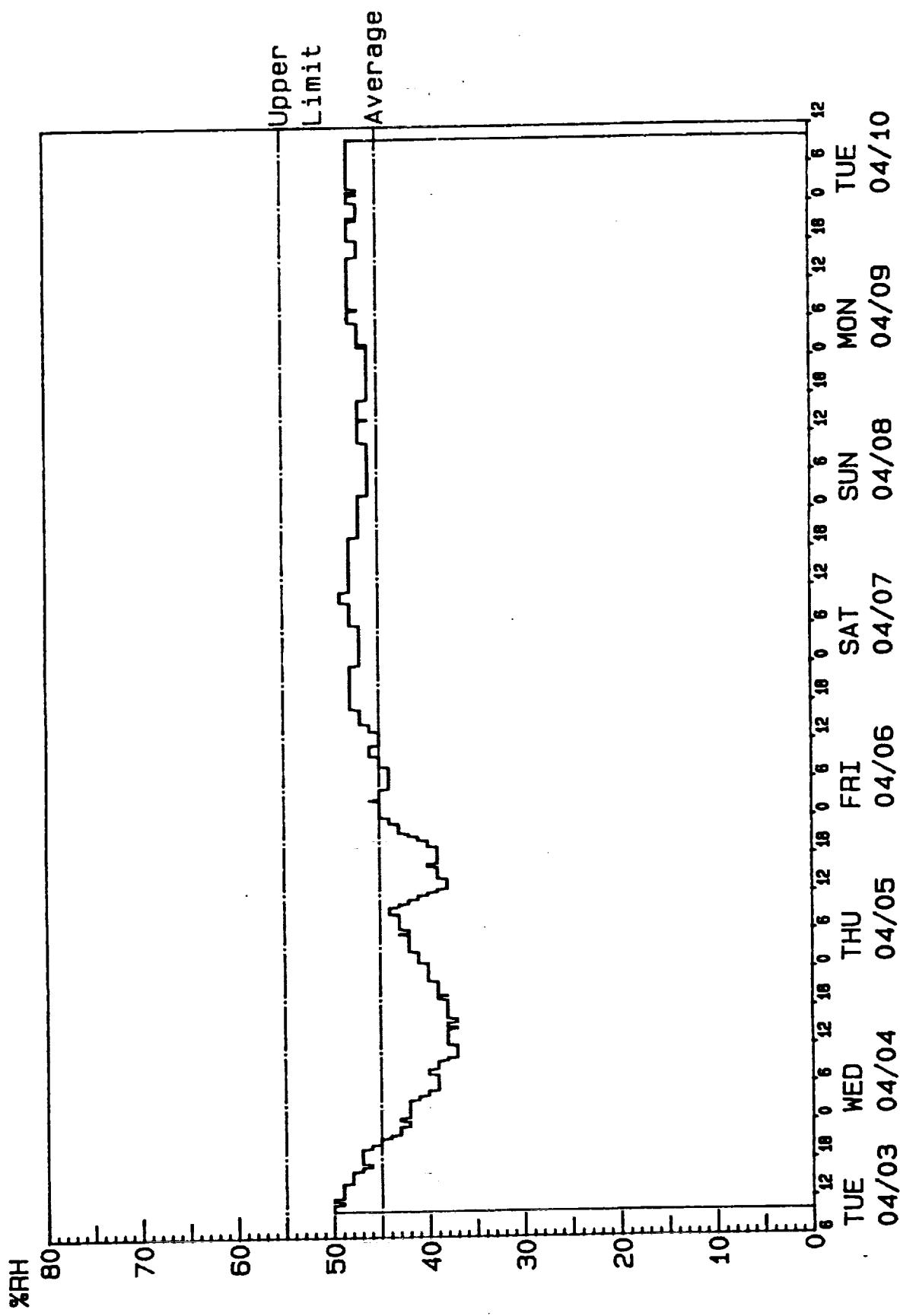


ORIGINAL PAGE IS
OF POOR QUALITY

RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

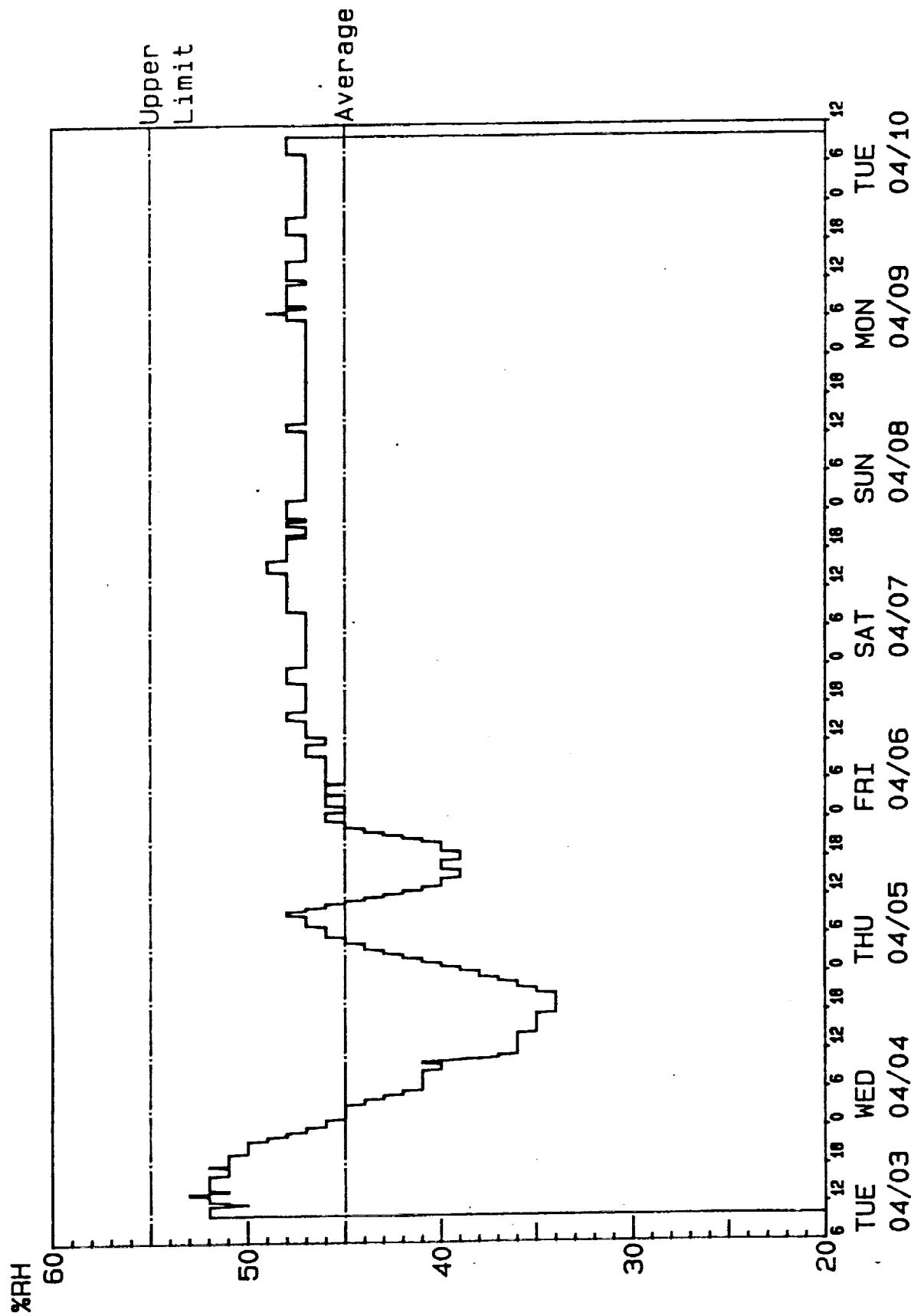
SITE: HIGH BAY EAST WALL (C09)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

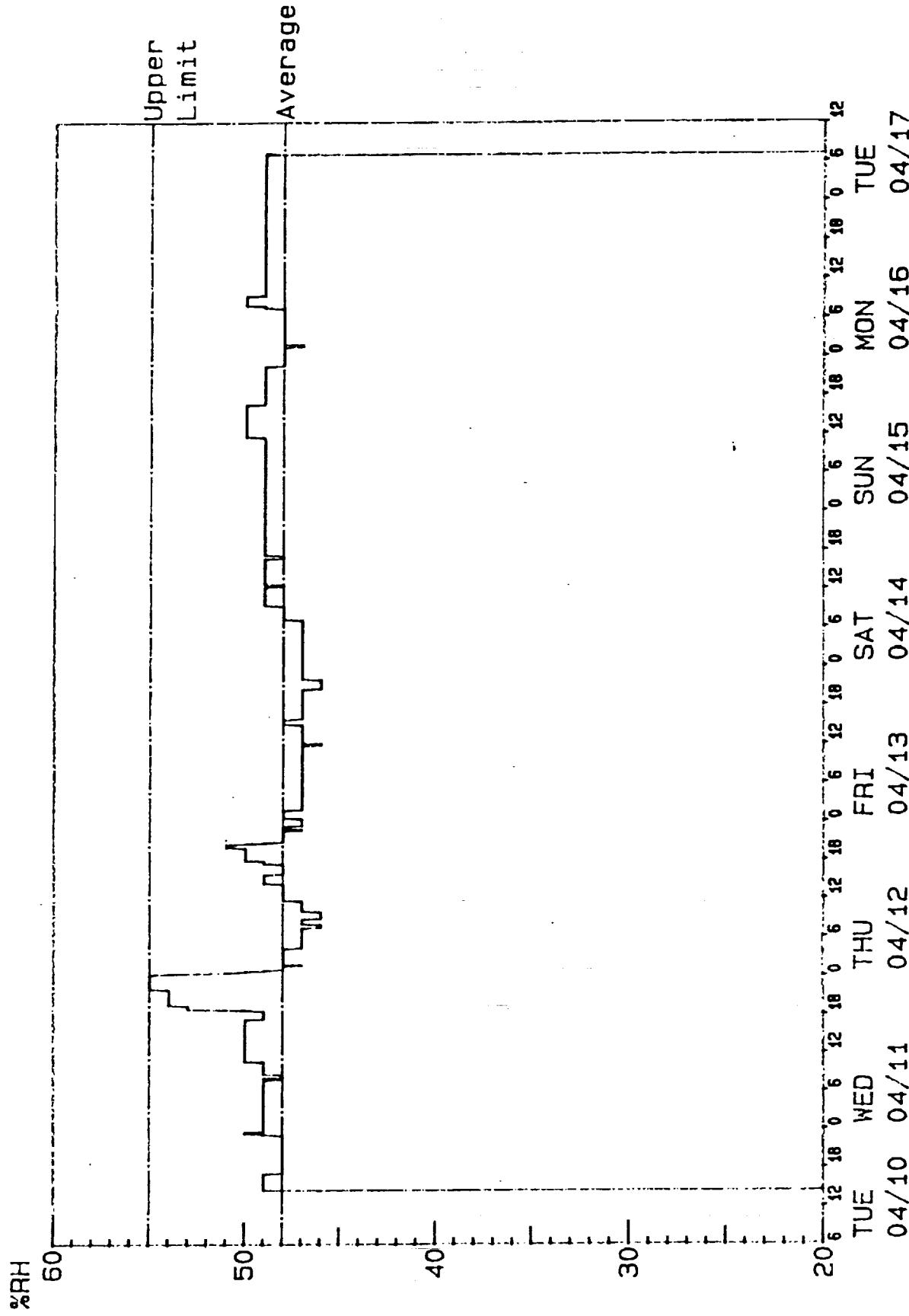
SITE: AIRLOCK EAST WALL (C14)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

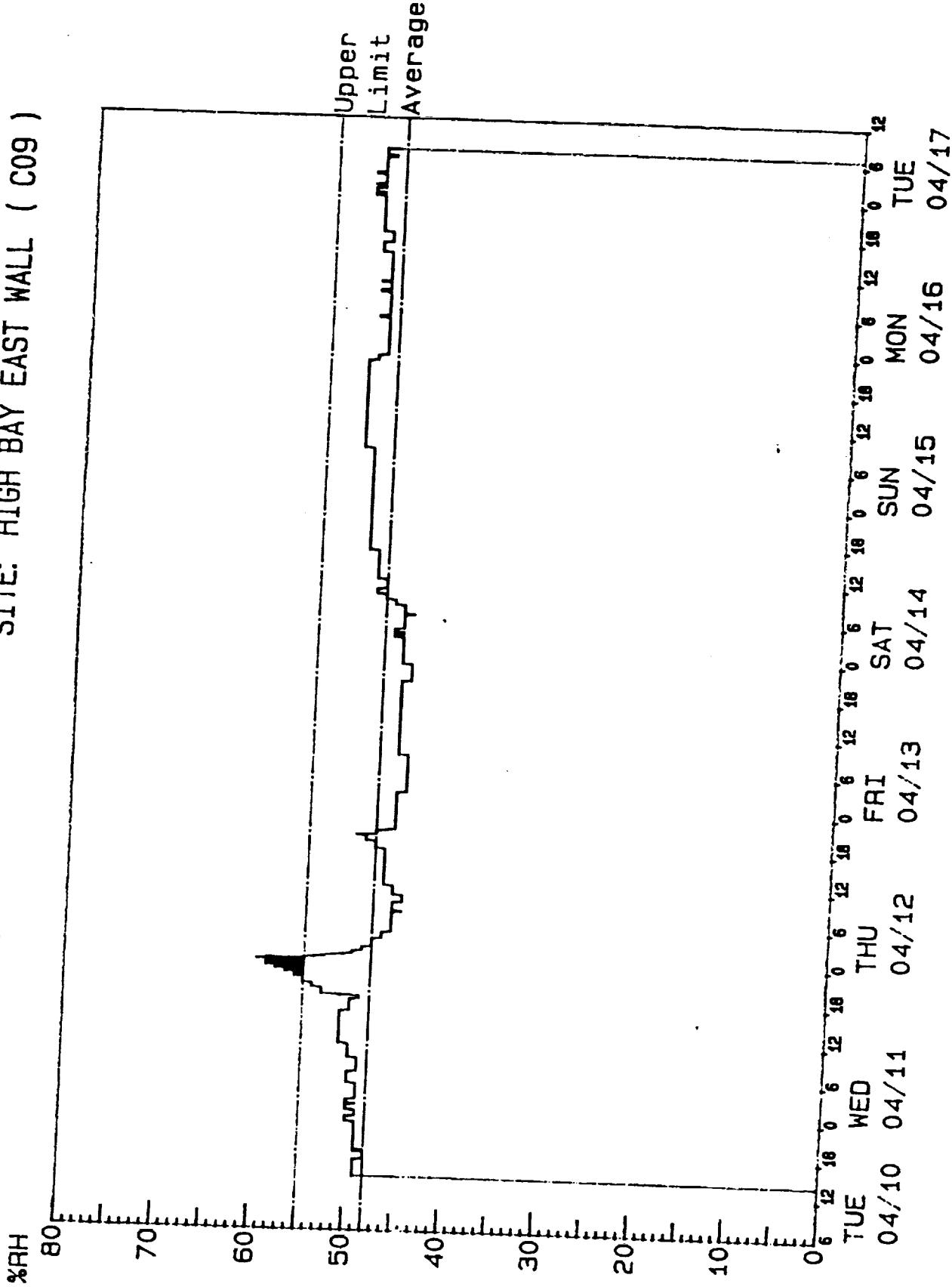
SITE: AIRLOCK EAST WALL (C14)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

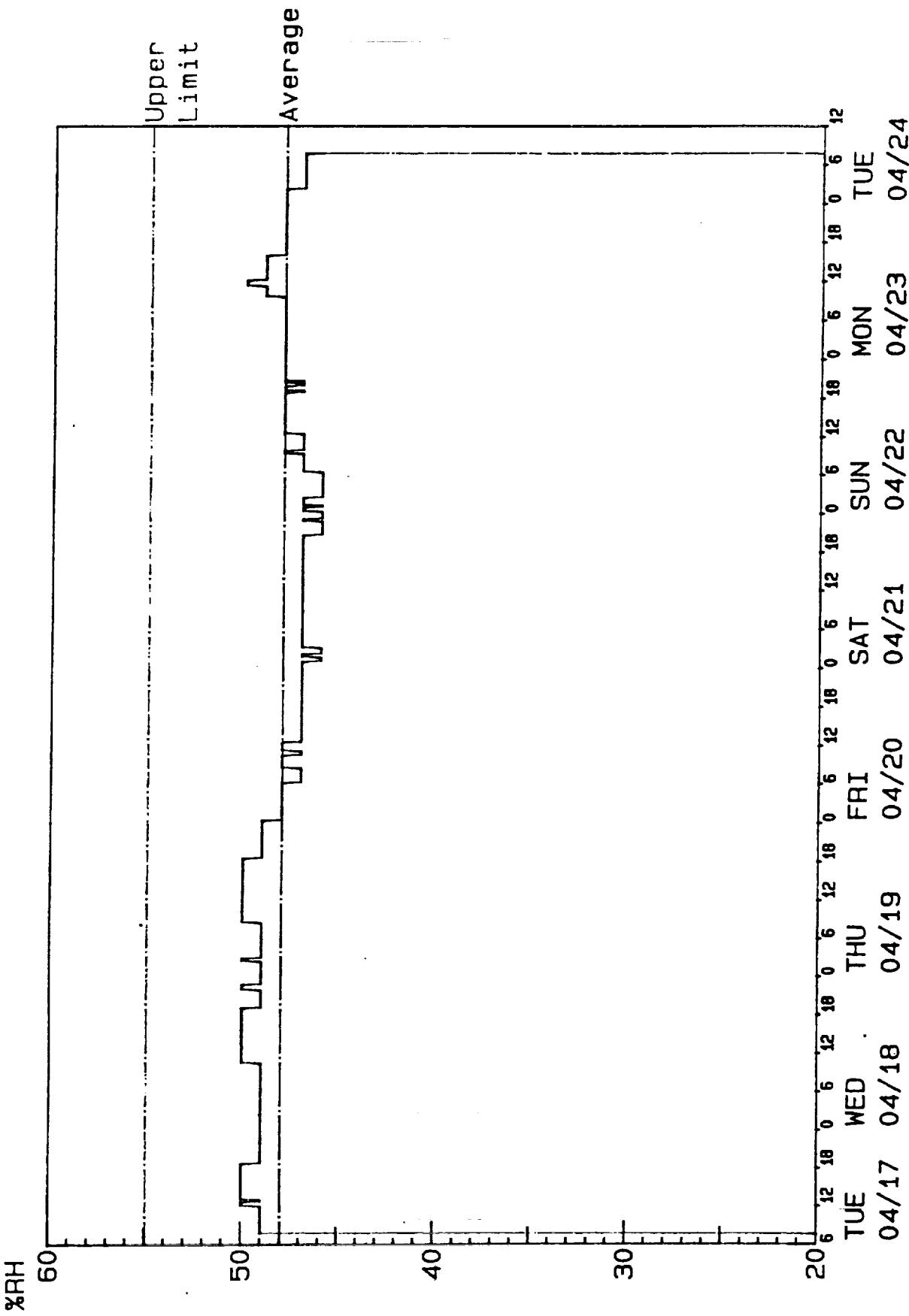
SITE: HIGH BAY EAST WALL (C09)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

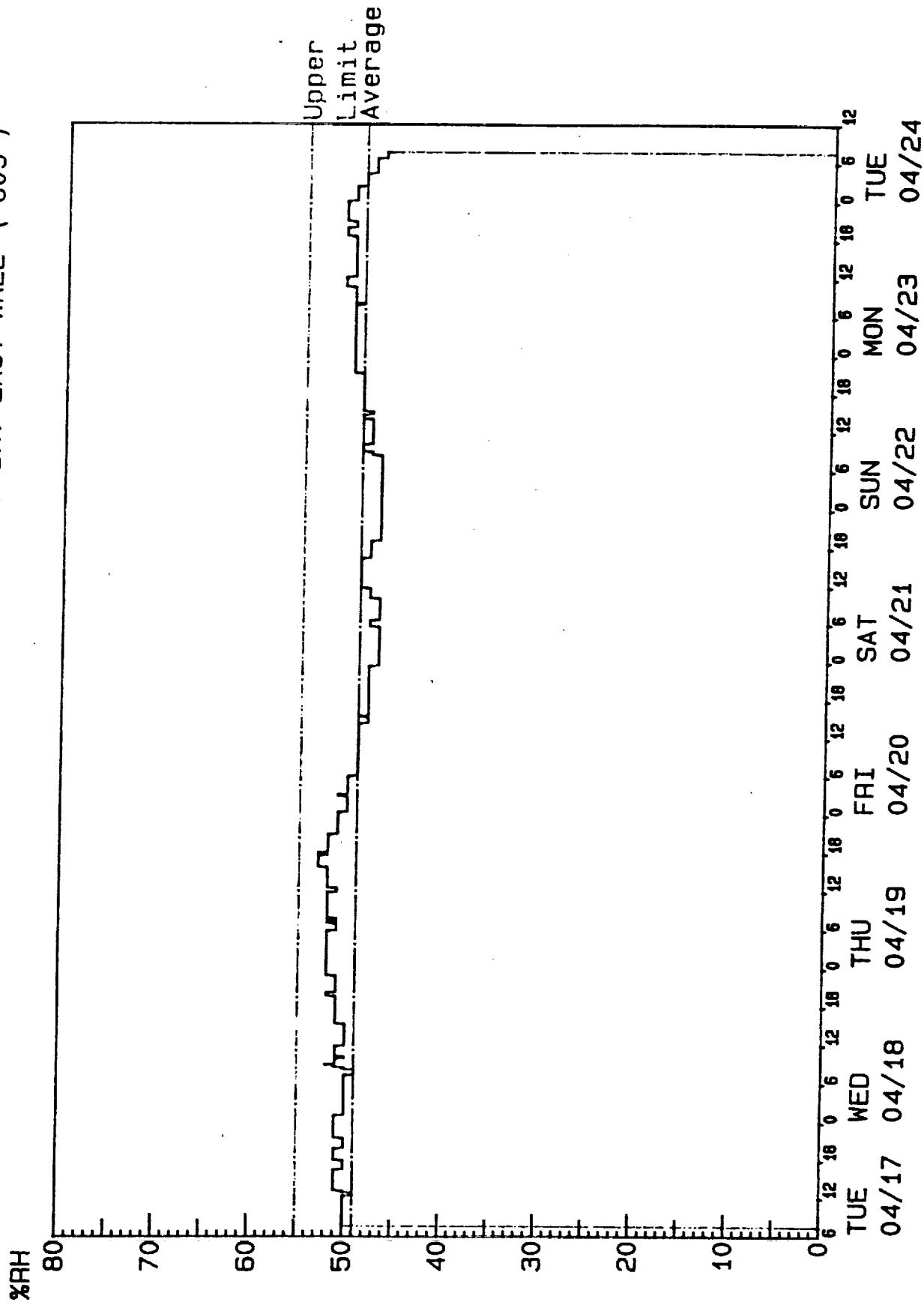
SITE: AIRLOCK EAST WALL (C14)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

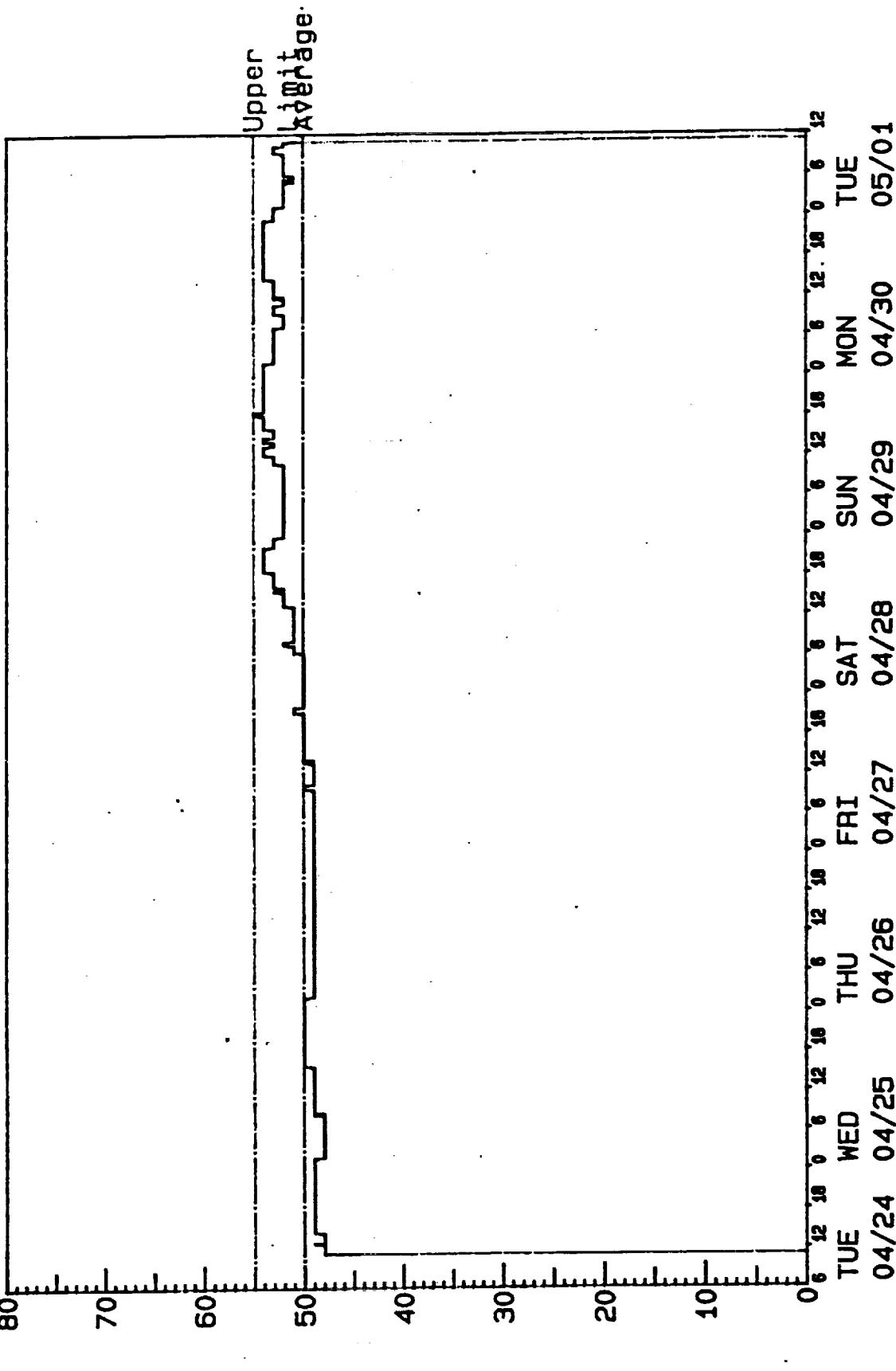
SITE: HIGH BAY EAST WALL (C09)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II SITE: HIGH BAY EAST WALL (C09)

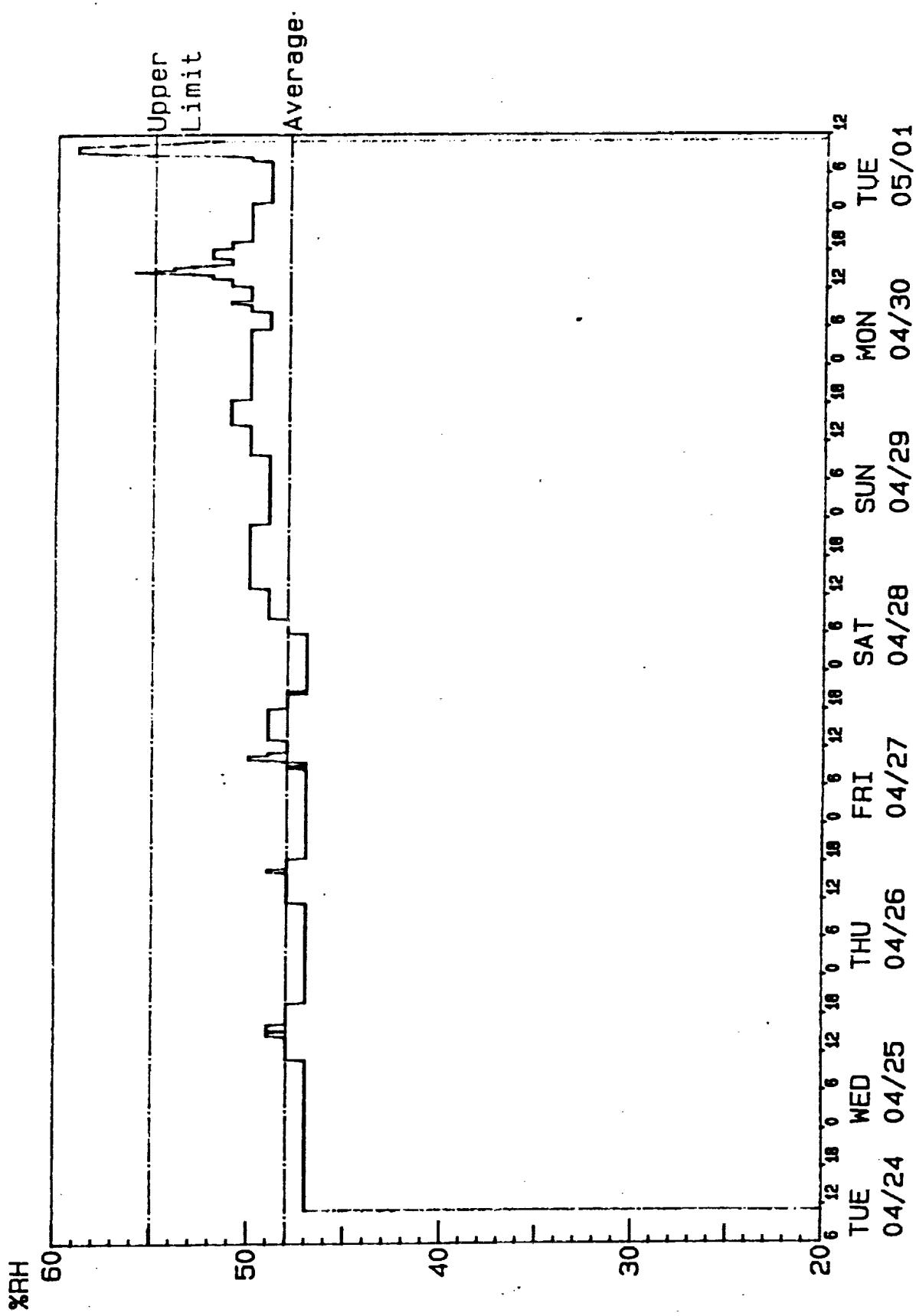
HBK



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

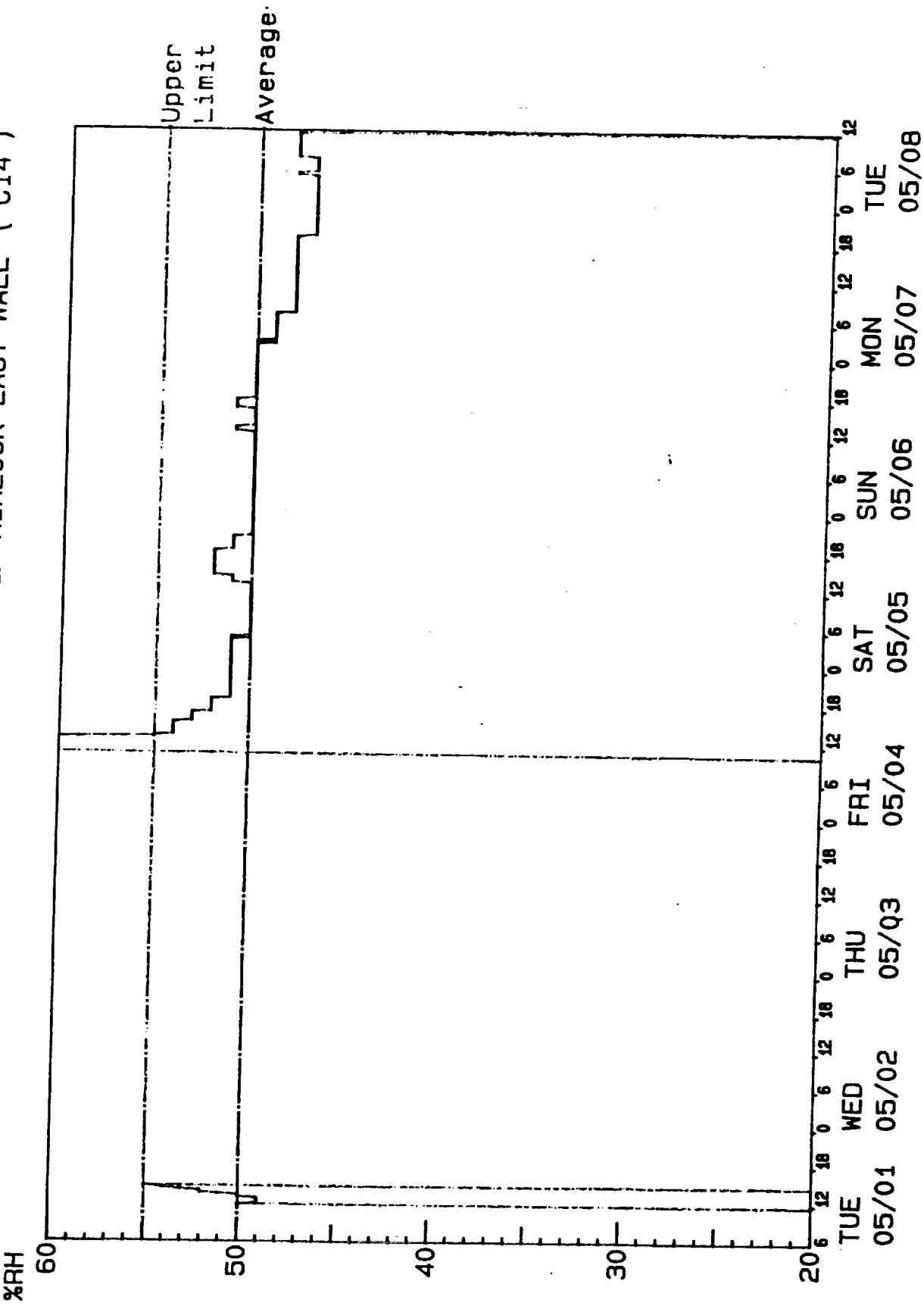
SITE: AIRLOCK EAST WALL (C14)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

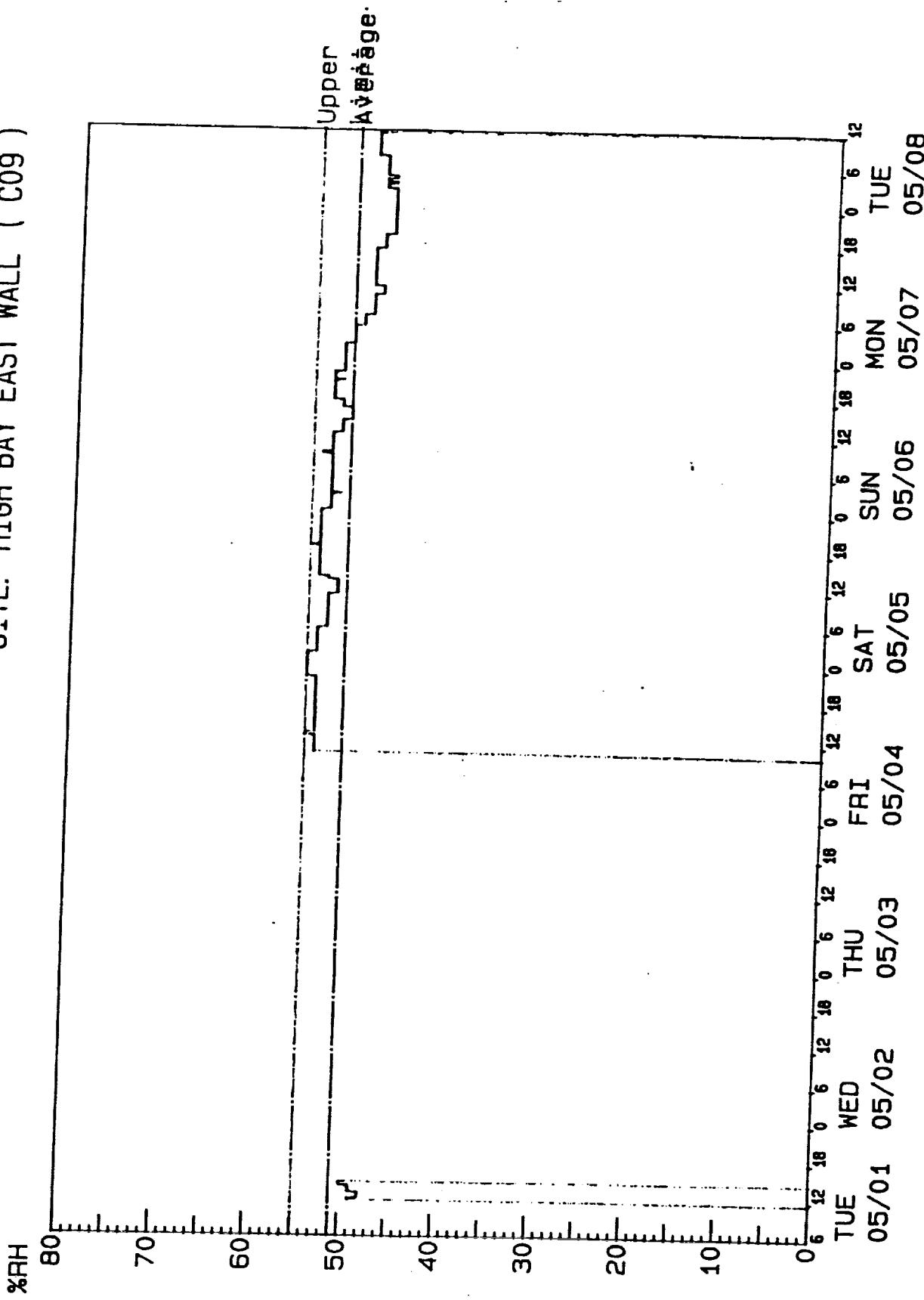
SITE: AIRLOCK EAST WALL (C14)



RELATIVE HUMIDITY VS TIME

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C09)

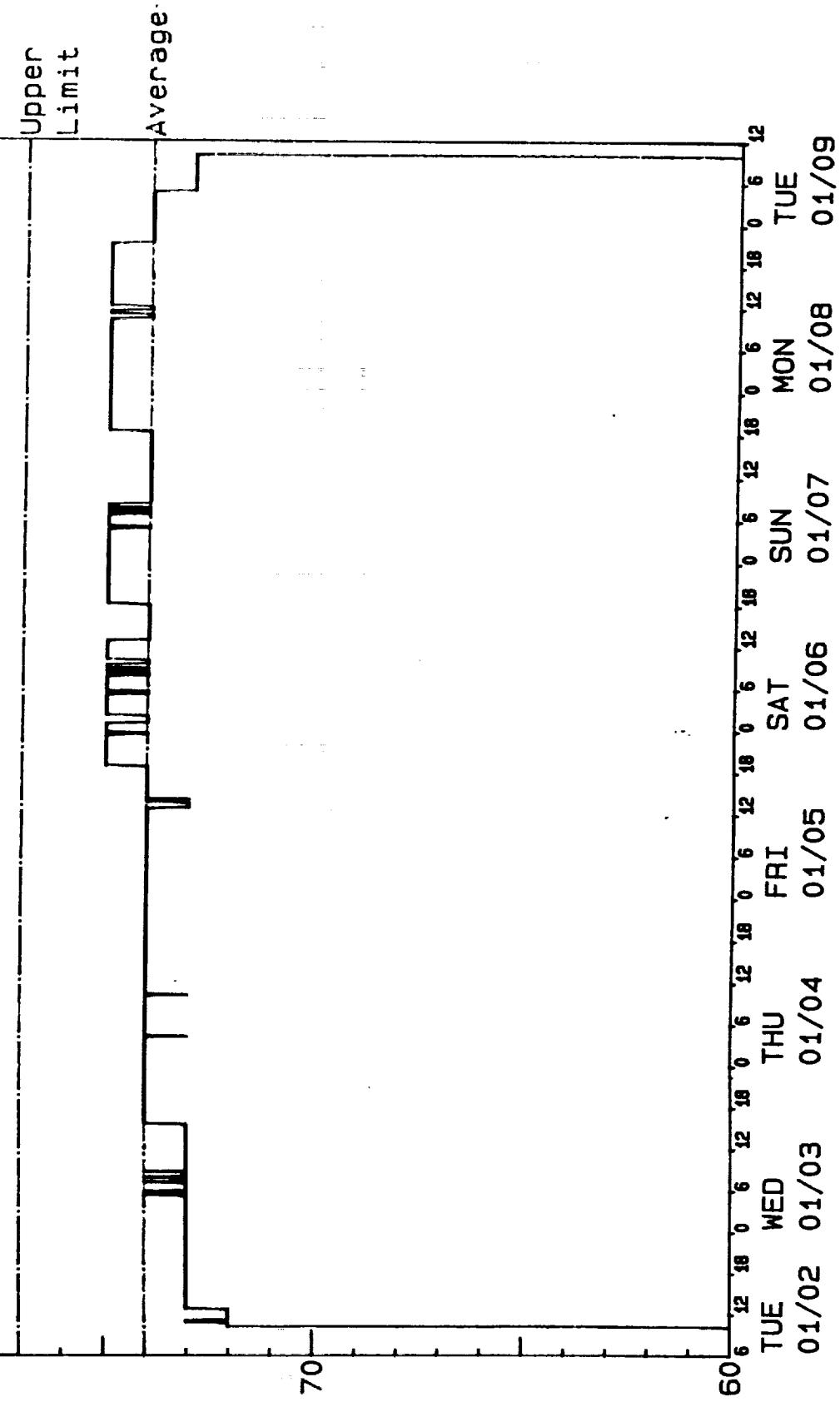


TEMPERATURE VS TIME

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C10)

*F



TEMPERATURE VS TIME

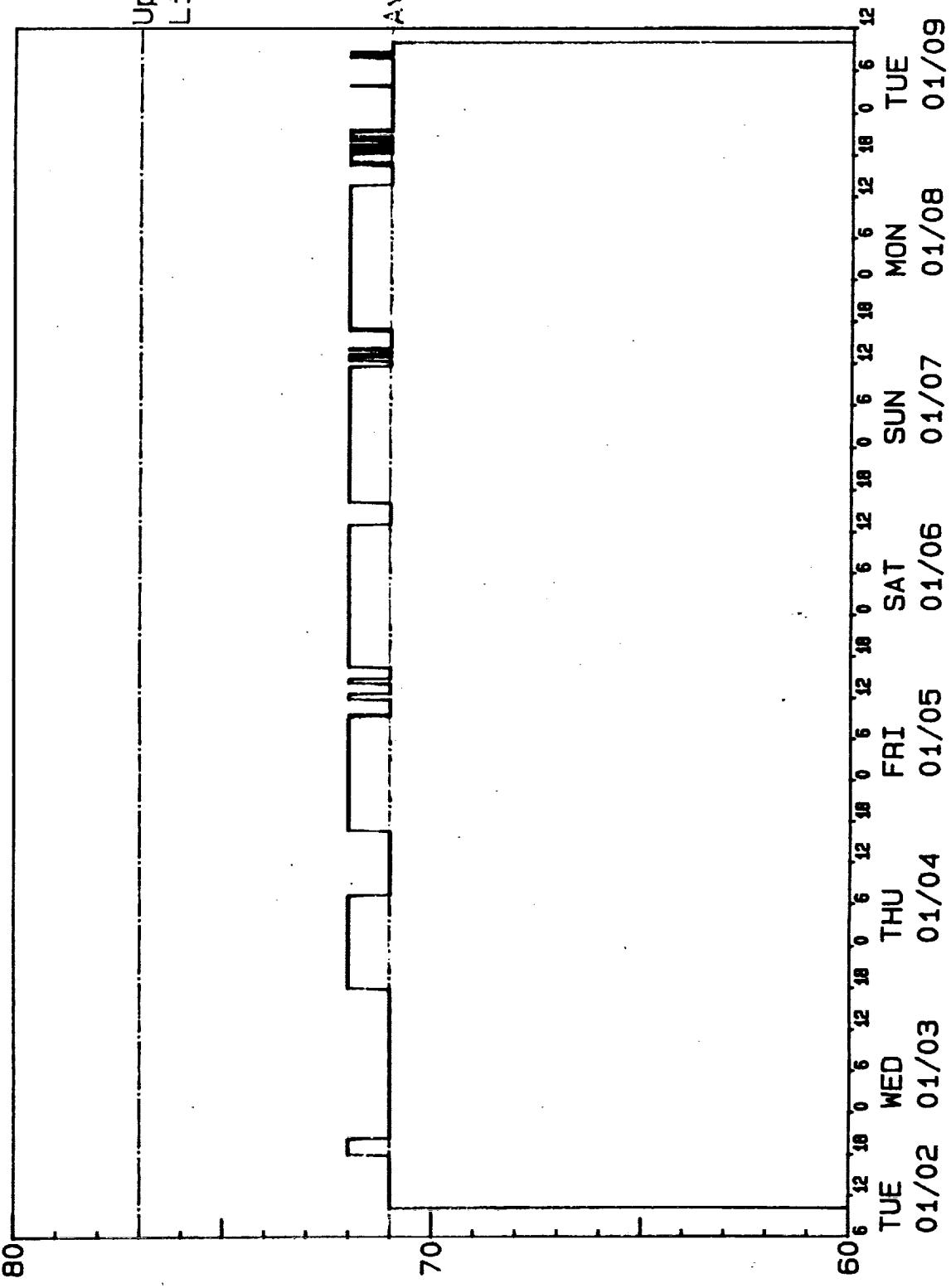
FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C13)

*F

Upper
Limit

Average

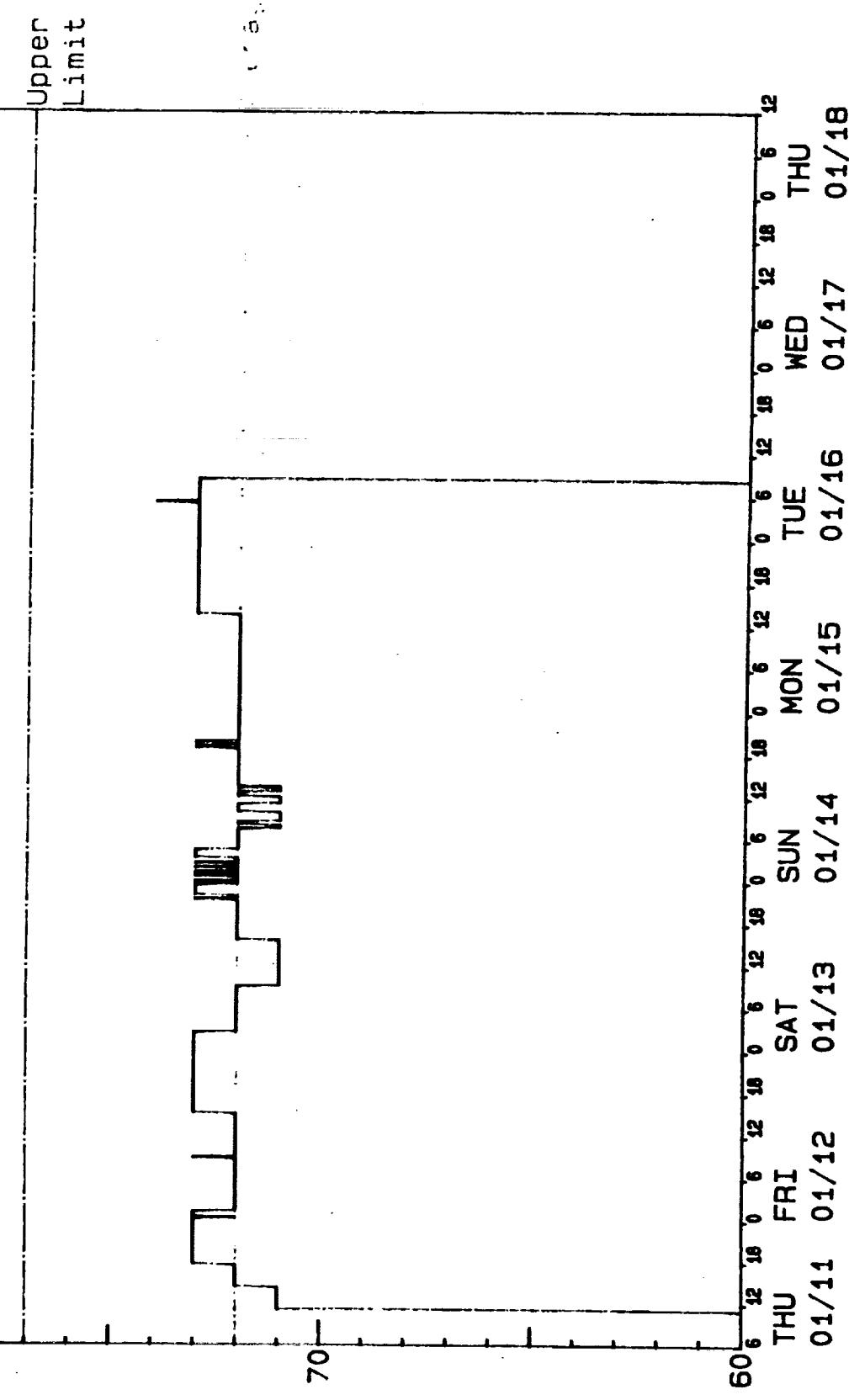


TEMPERATURE VS TIME

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C10)

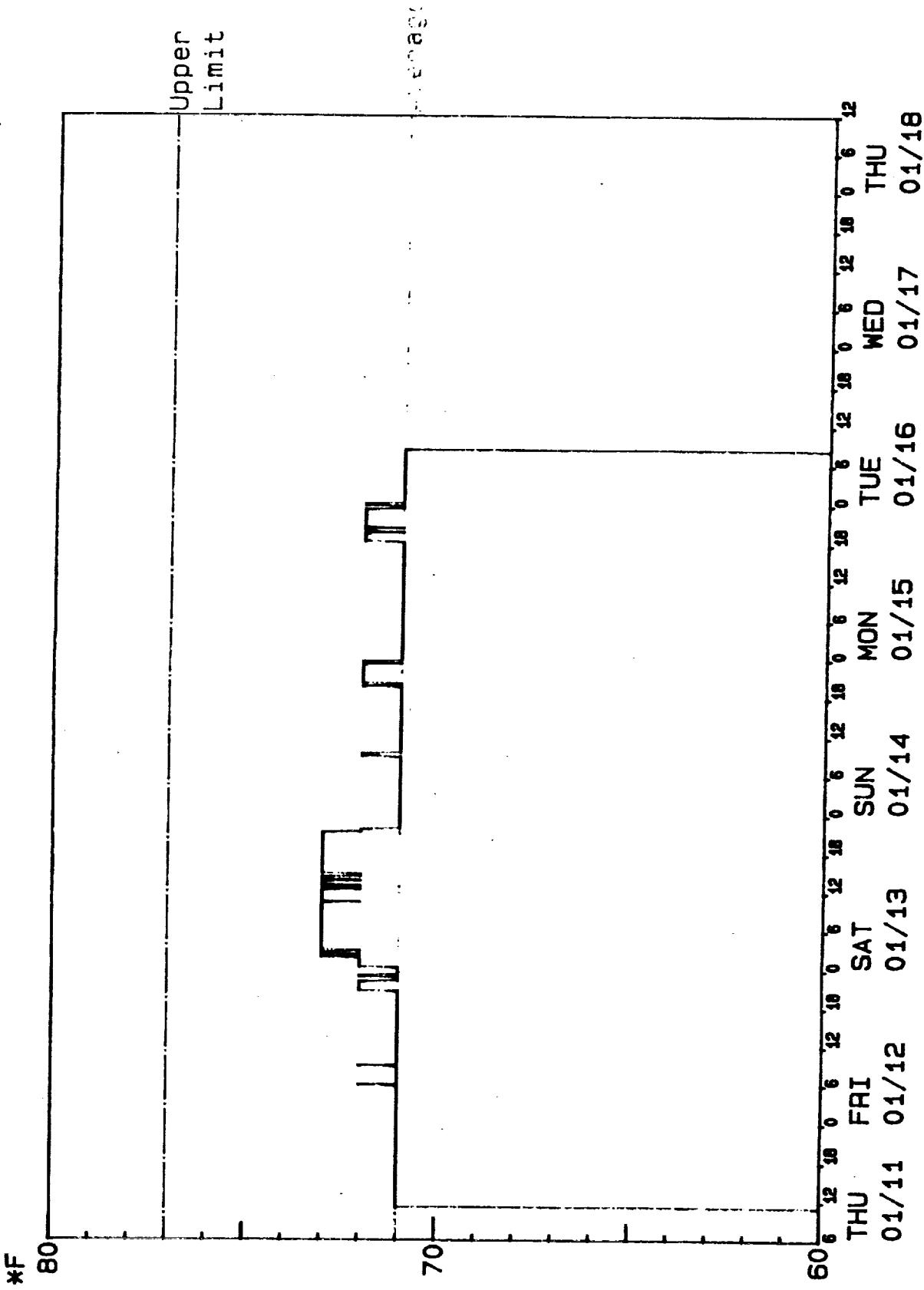
*F



TEMPERATURE VS TIME

FACILITY: SAEF II

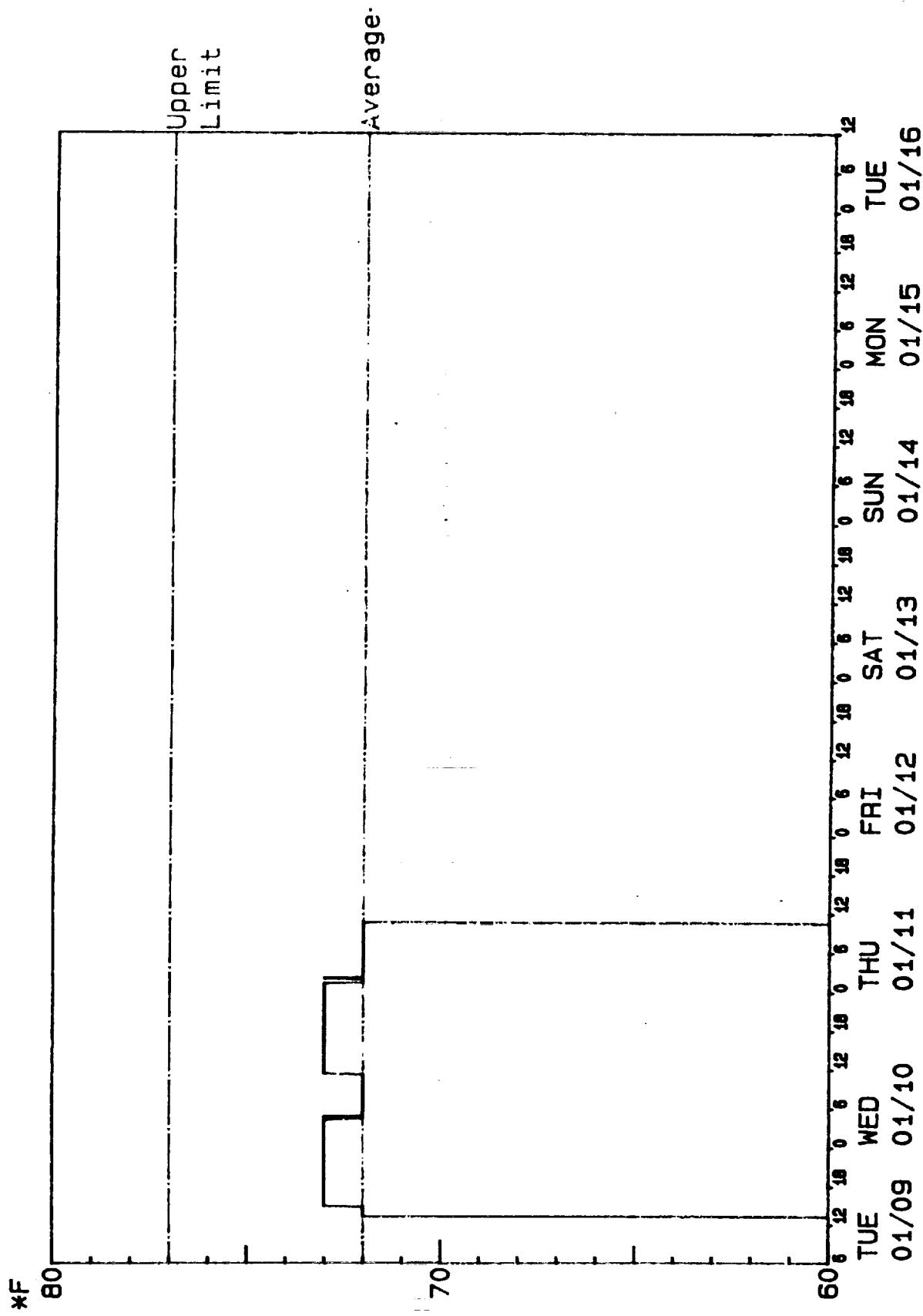
SITE: HIGH BAY EAST WALL (C13)



INTEGRATED VS TIME

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C10)



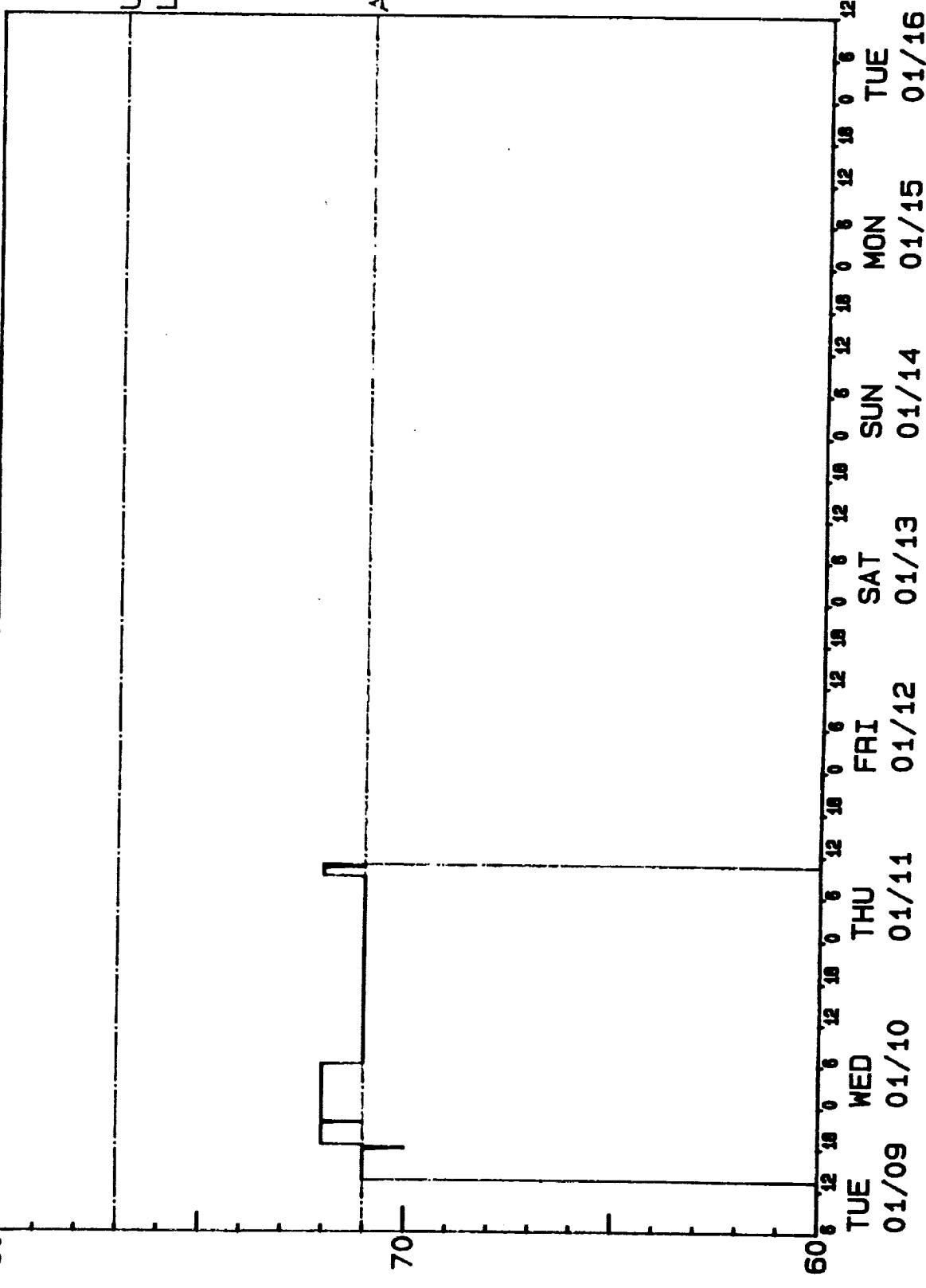
TEMPERATURE VS TIME

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C13)

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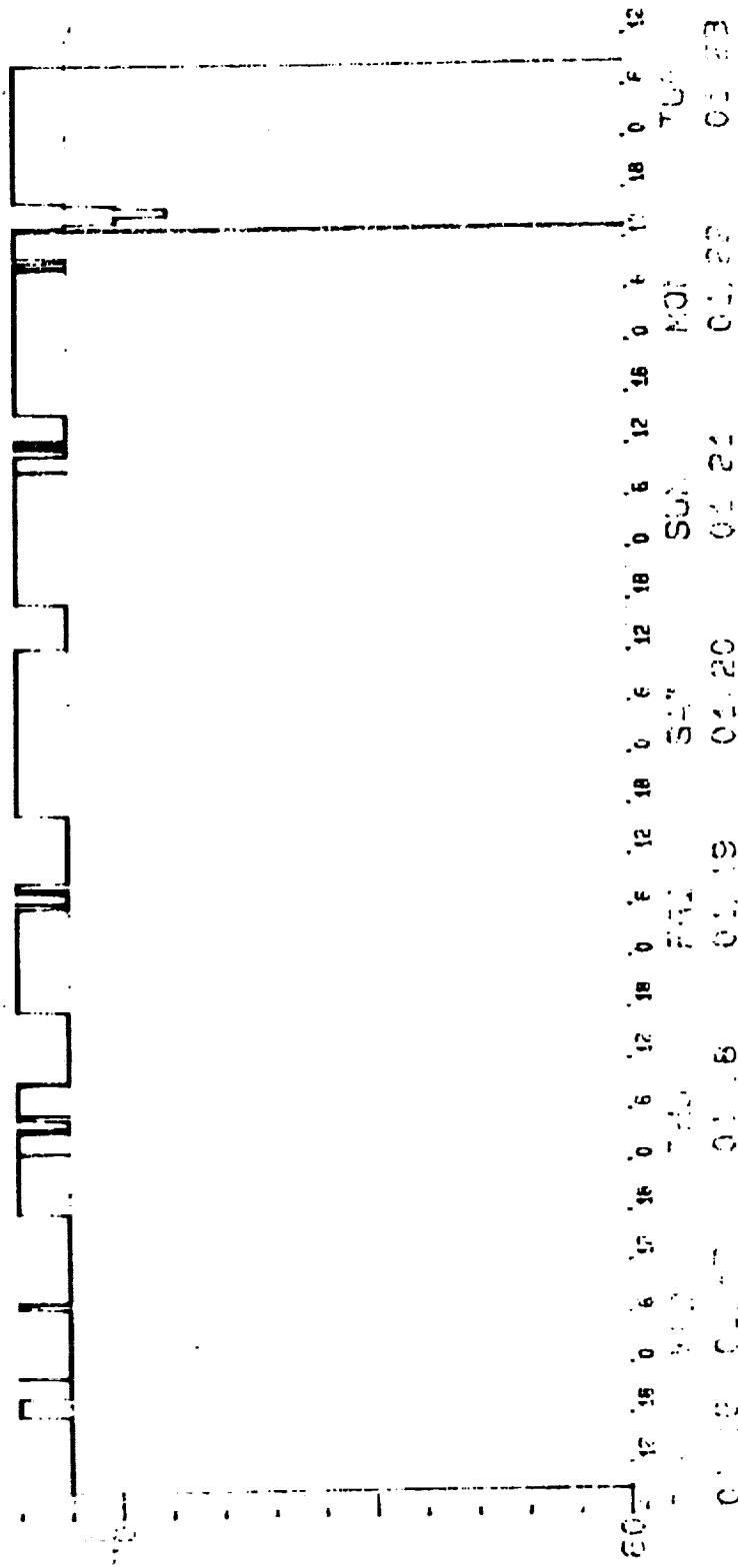
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Upper limit



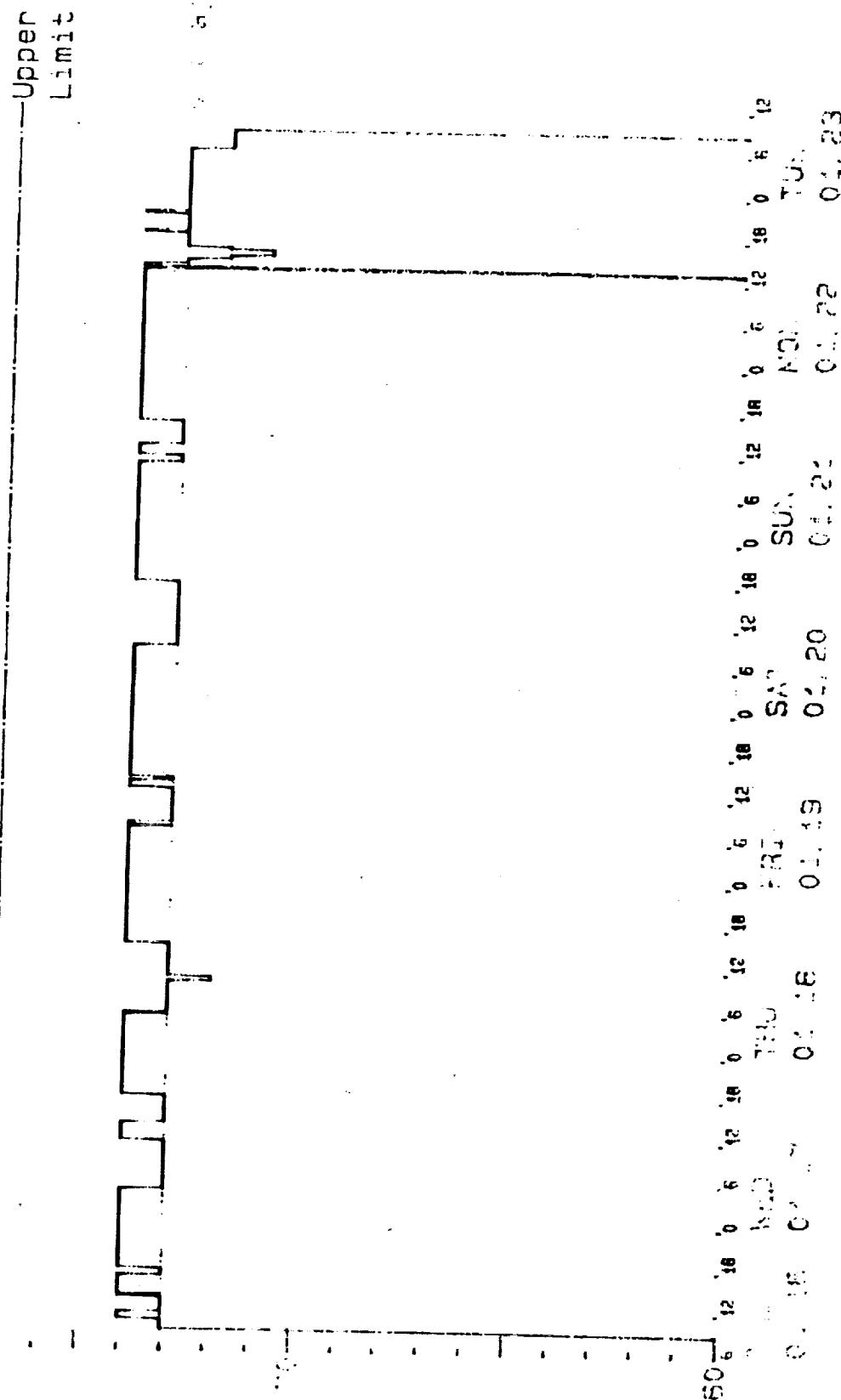
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1. Elevation 1000' - 5' T.M.

1.500'; SNE 10

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SNE: STATION 1000' (1000')

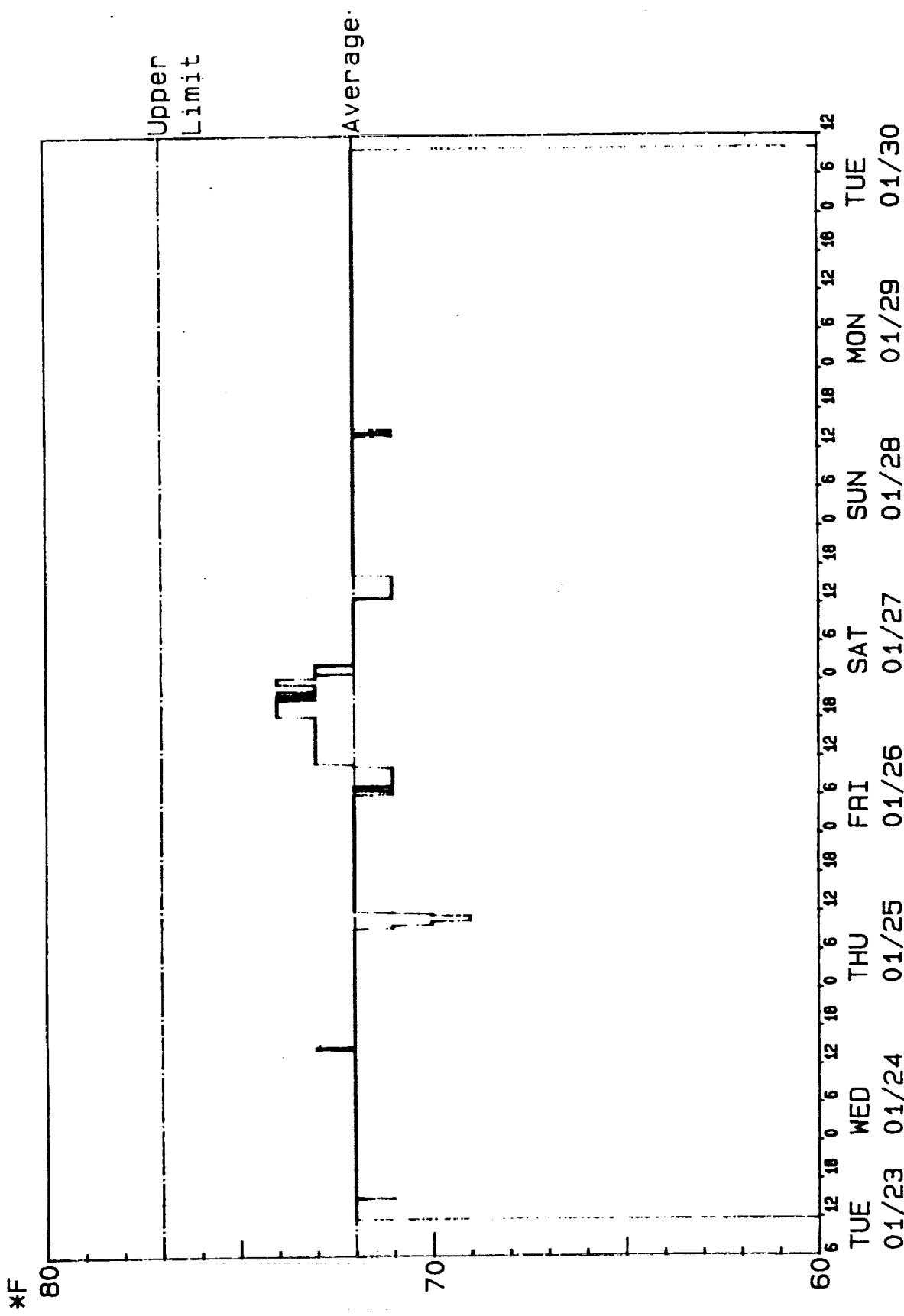


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TEMPERATURE VS TIME

FACILITY: SAEF II

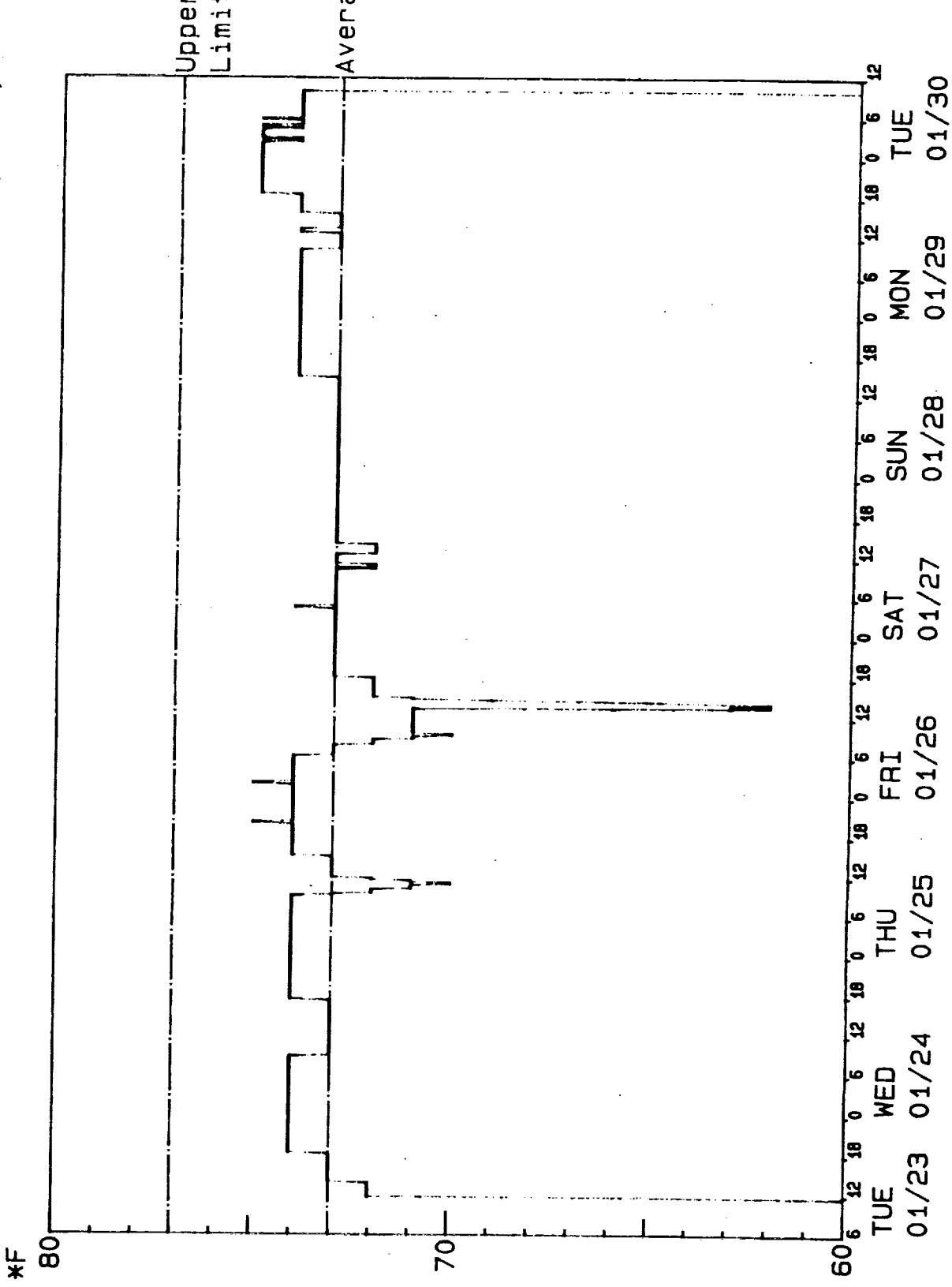
SITE: HIGH BAY EAST WALL (C13)



TEMPERATURE VS TIME

FACILITY: SAEF II

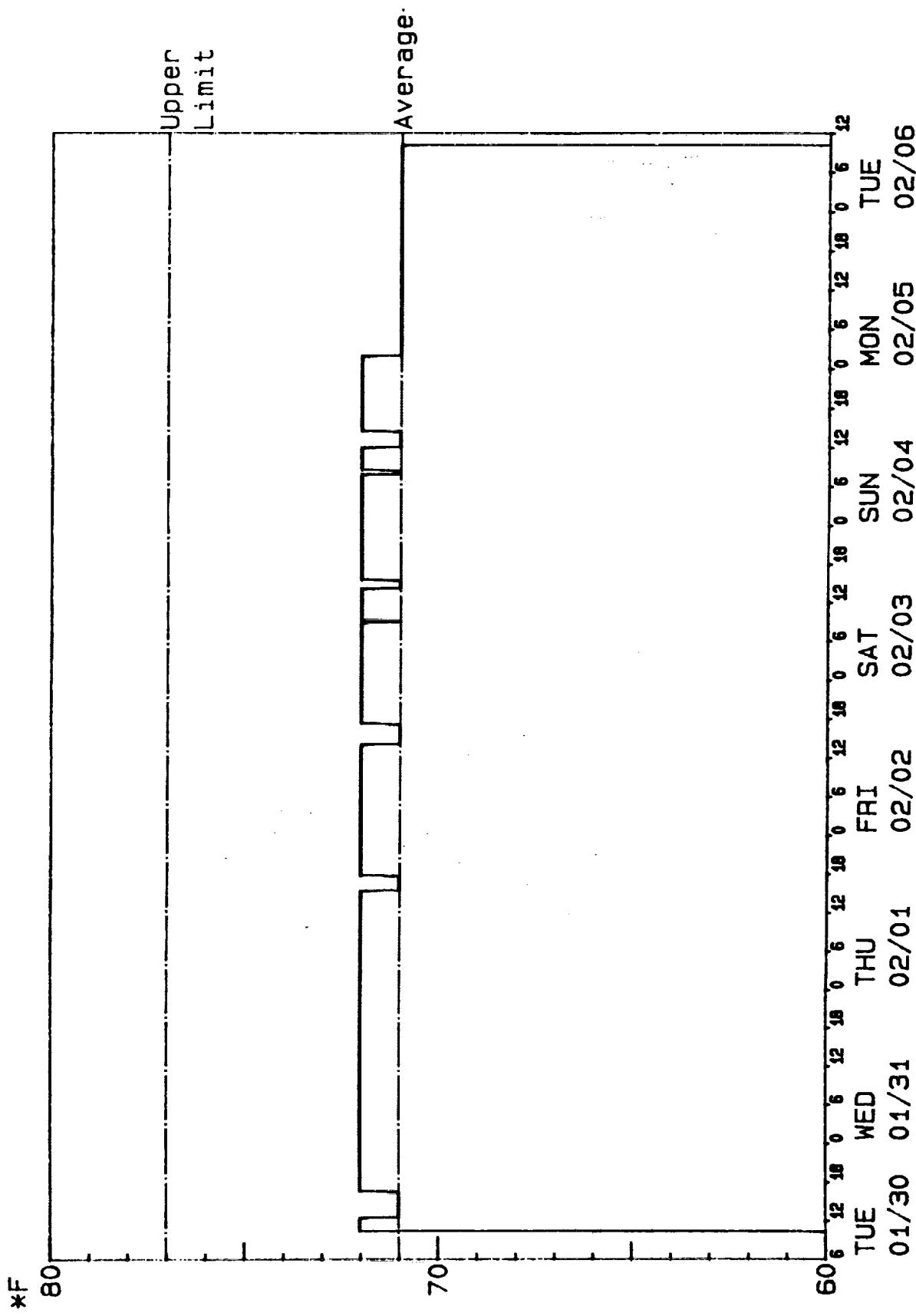
SITE: AIRLOCK EAST WALL (C10)



TEMPERATURE VS TIME

FACILITY: SAEF II

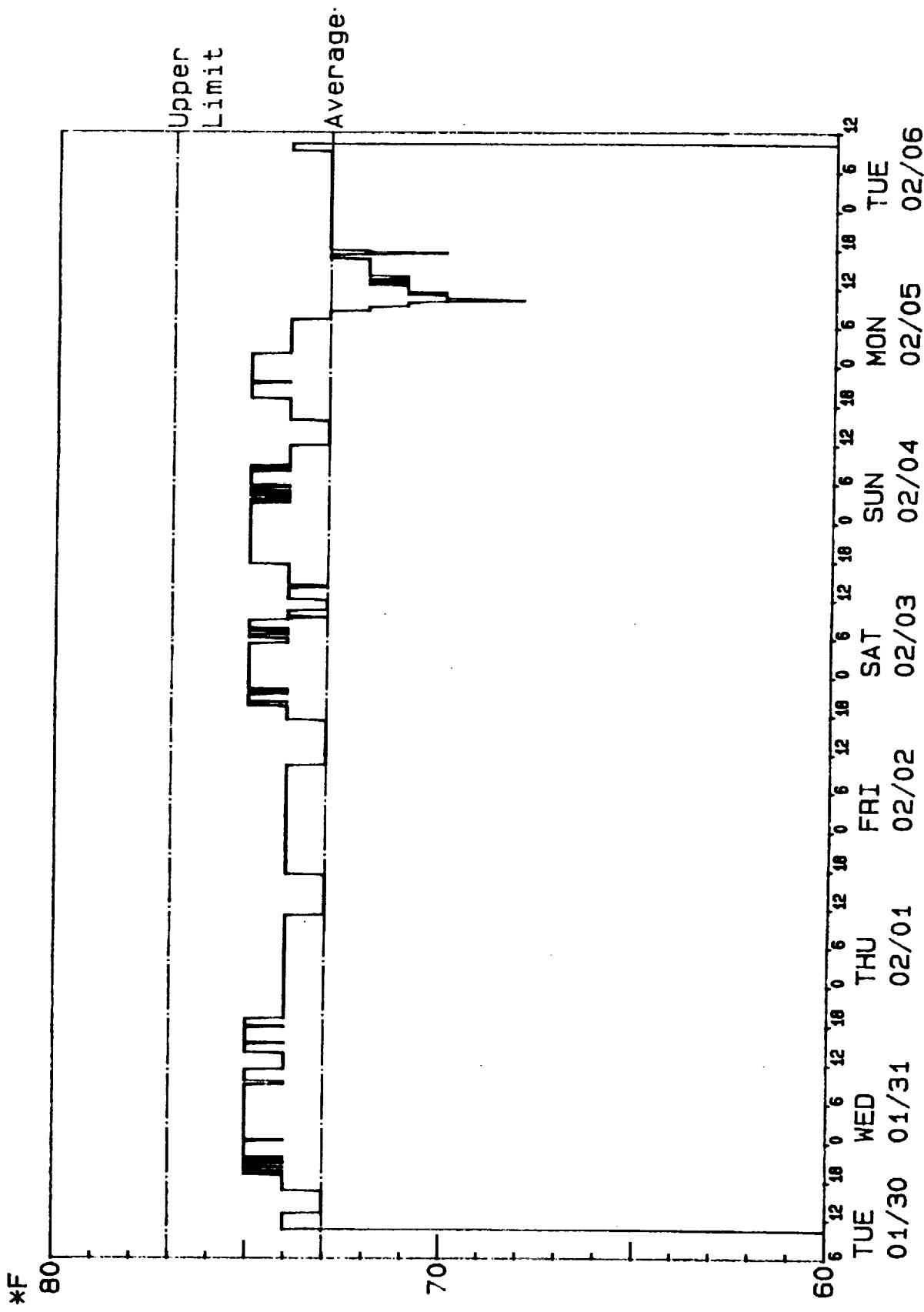
SITE: HIGH BAY EAST WALL (C13)



TEMPERATURE VS TIME

FACILITY: SAEF II

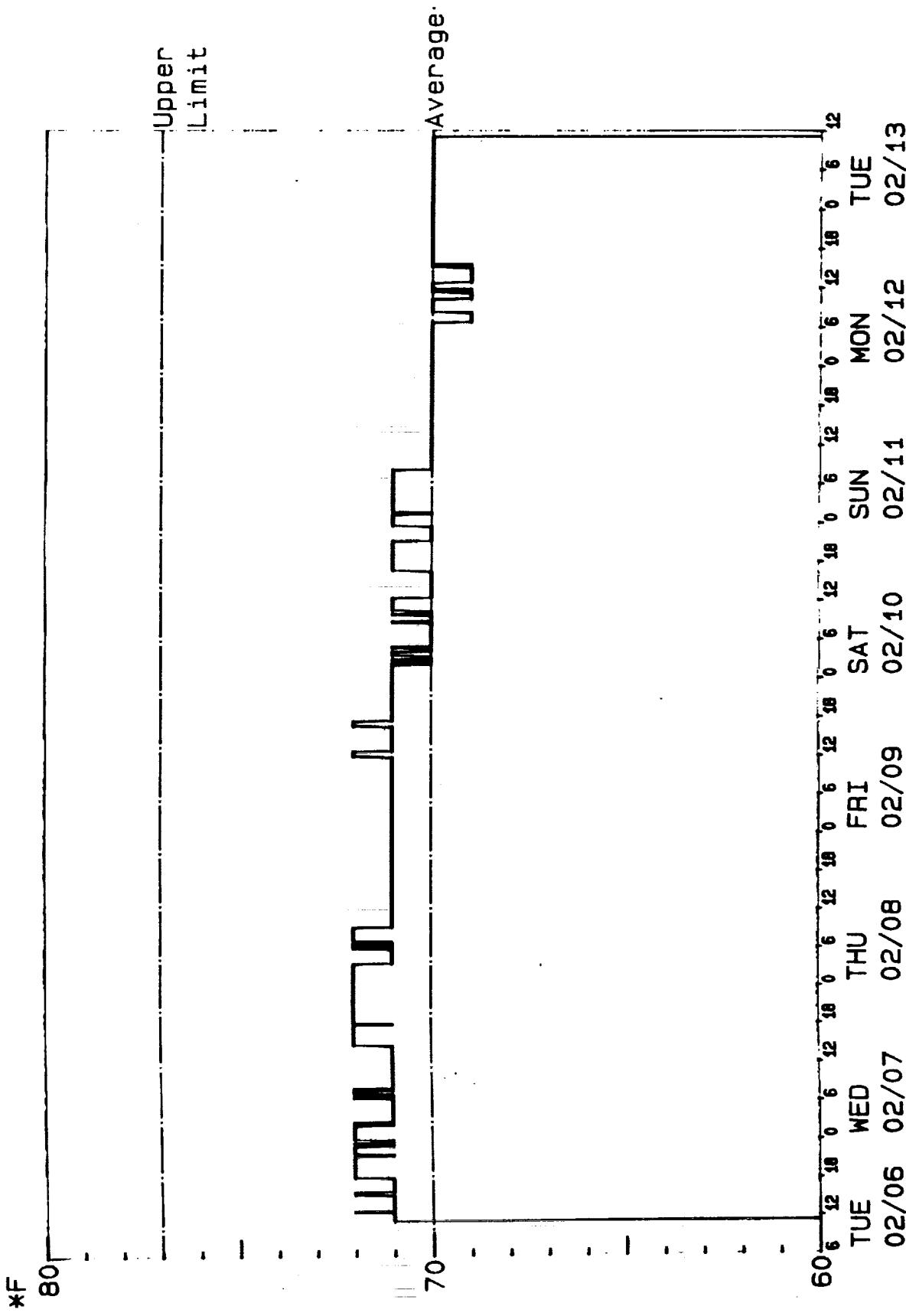
SITE: AIRLOCK EAST WALL (C10)



TEMPERATURE VS TIME

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C13)

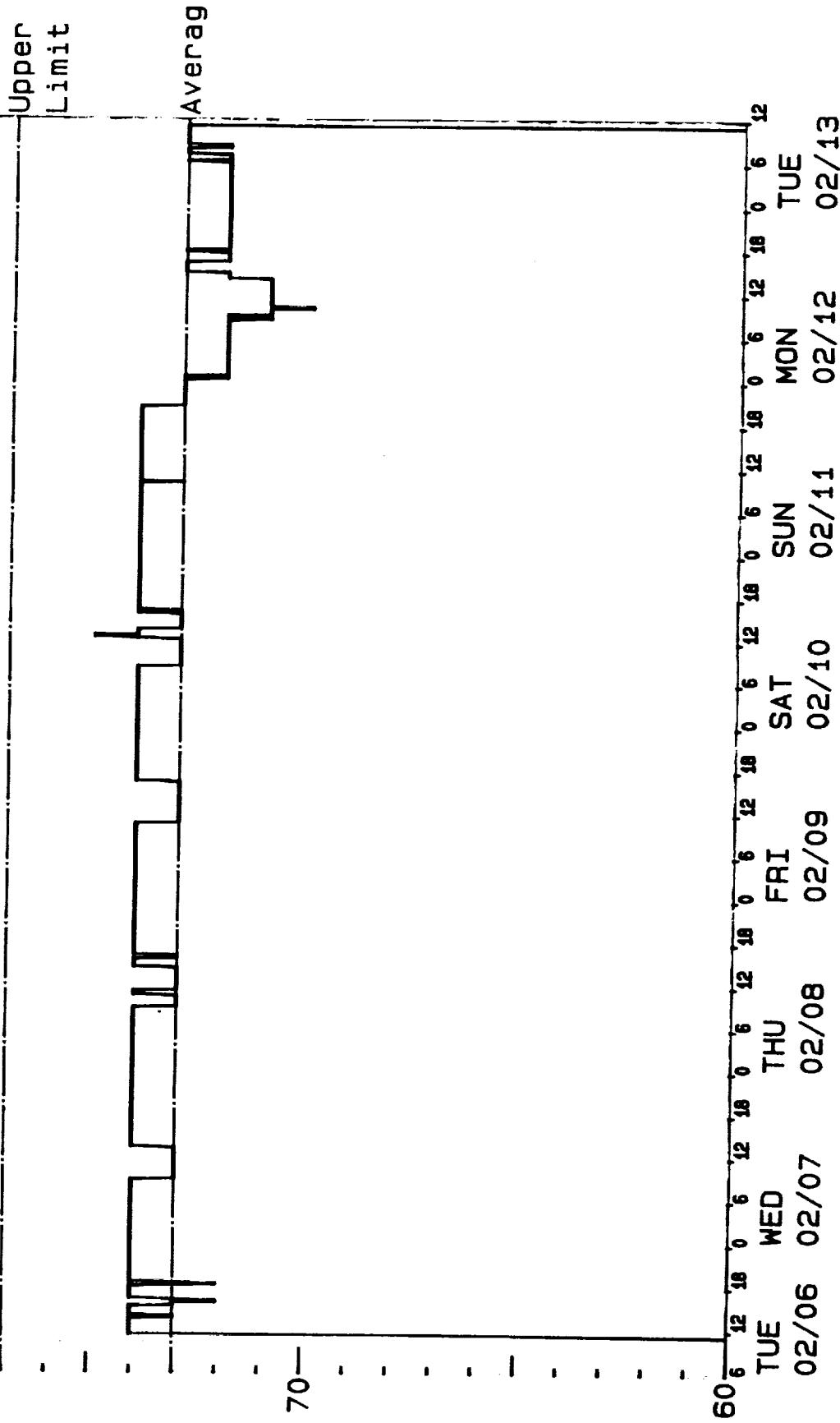


TEMPERATURE VS TIME

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C10)

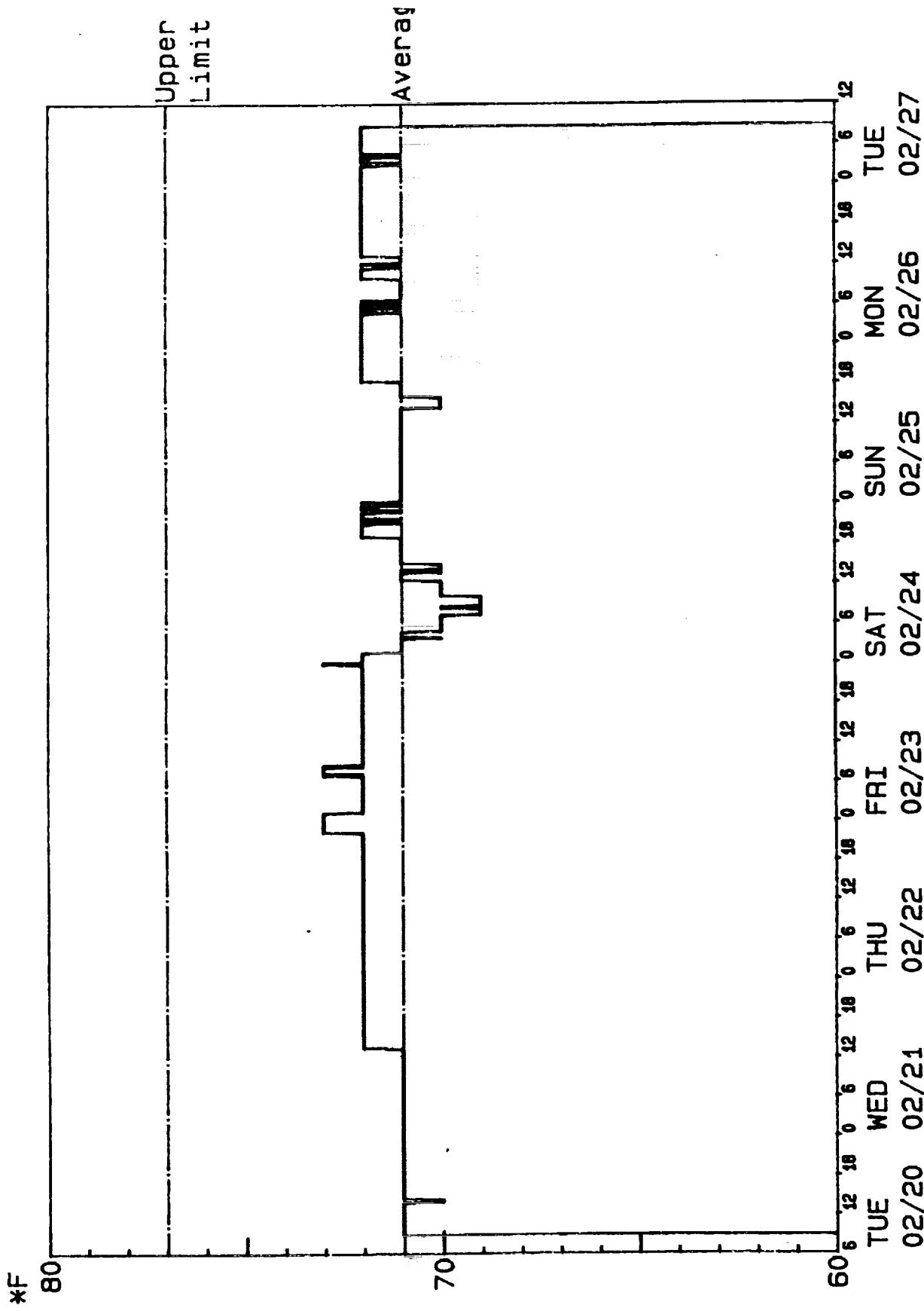
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TEMPERATURE VS TIME

FACILITY: SAEF II

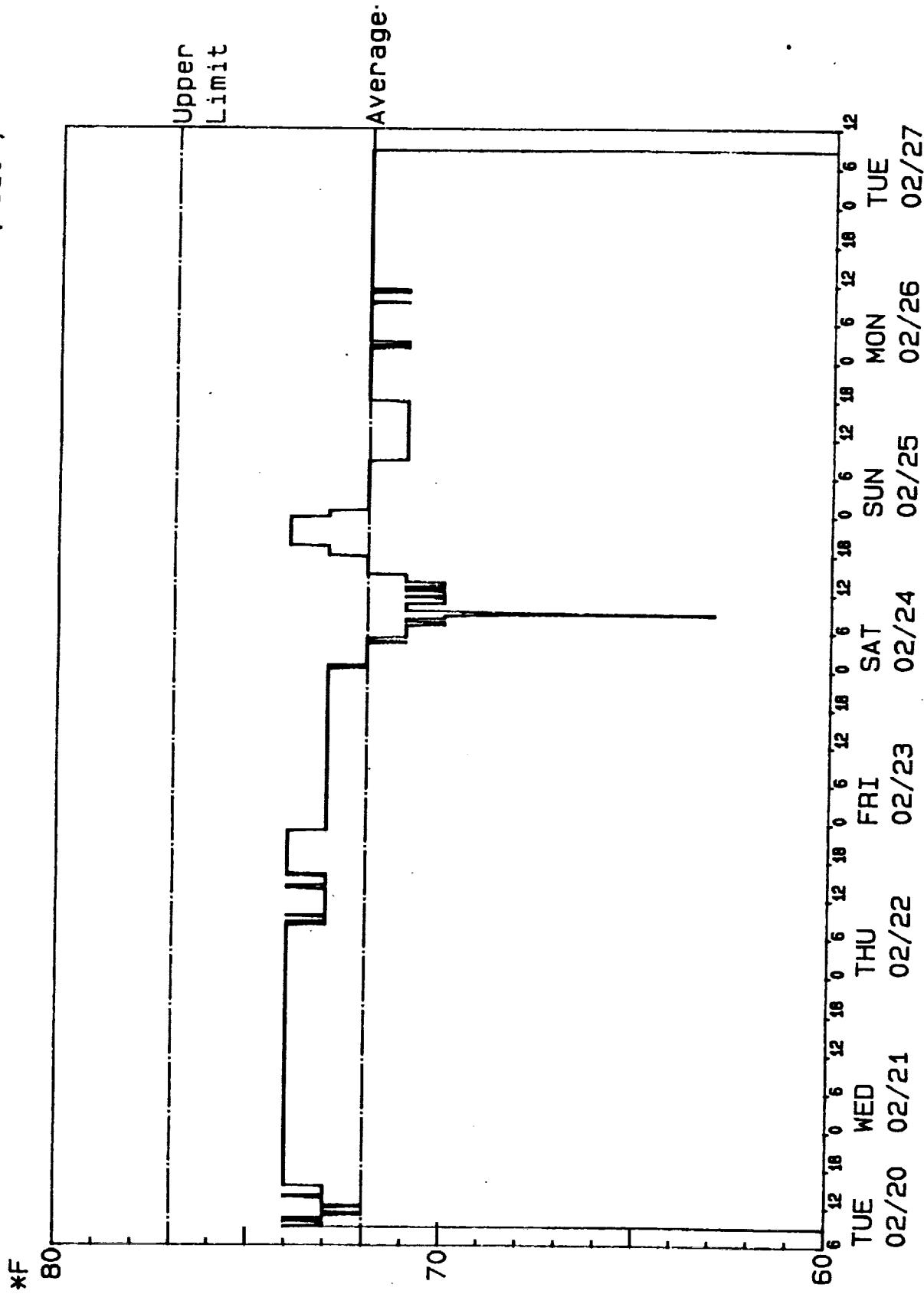
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TEMPERATURE VS TIME

FACILITY: SAEF II

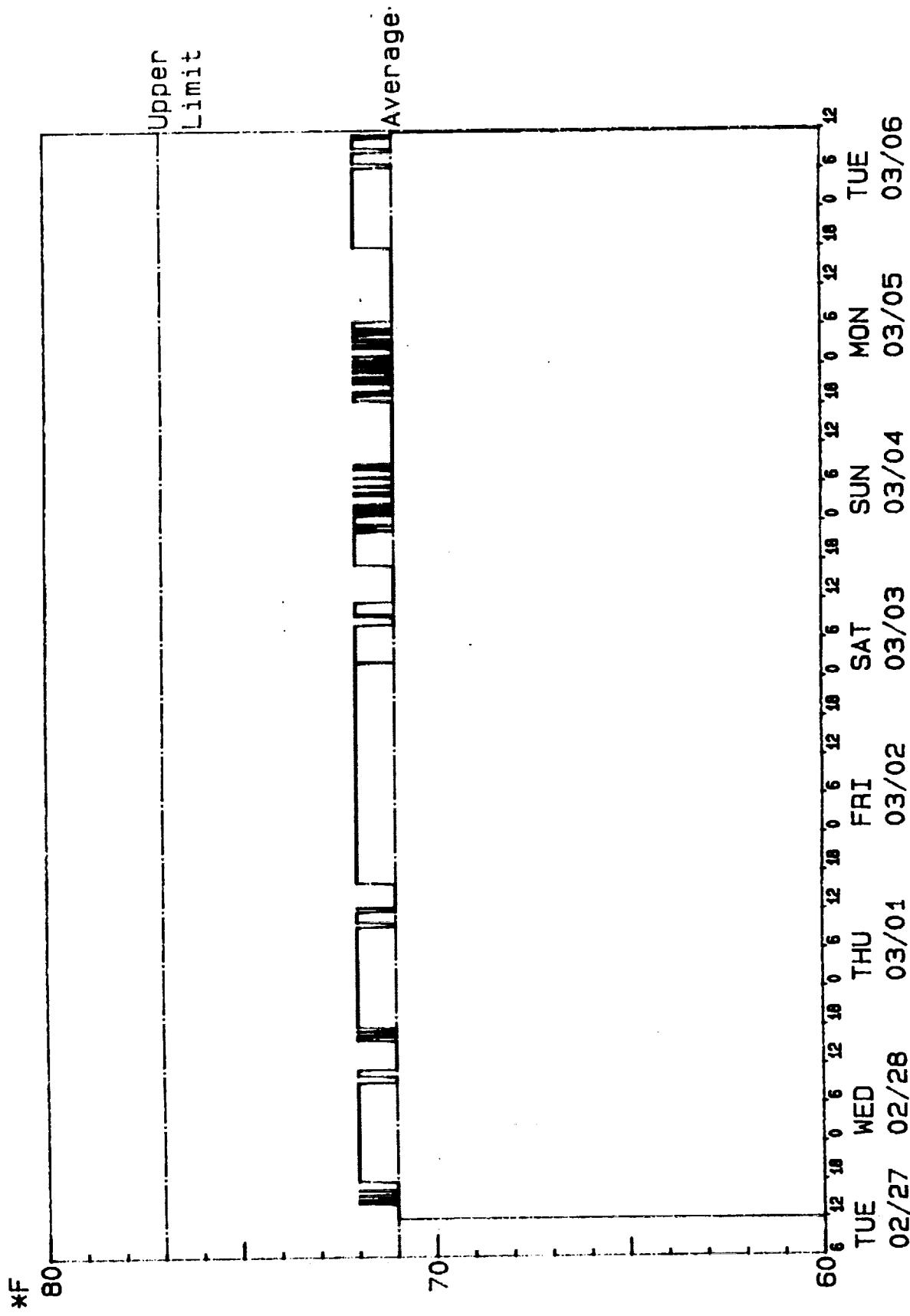
SITE: AIRLOCK EAST WALL (C10)



TEMPERATURE VS TIME

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C13)

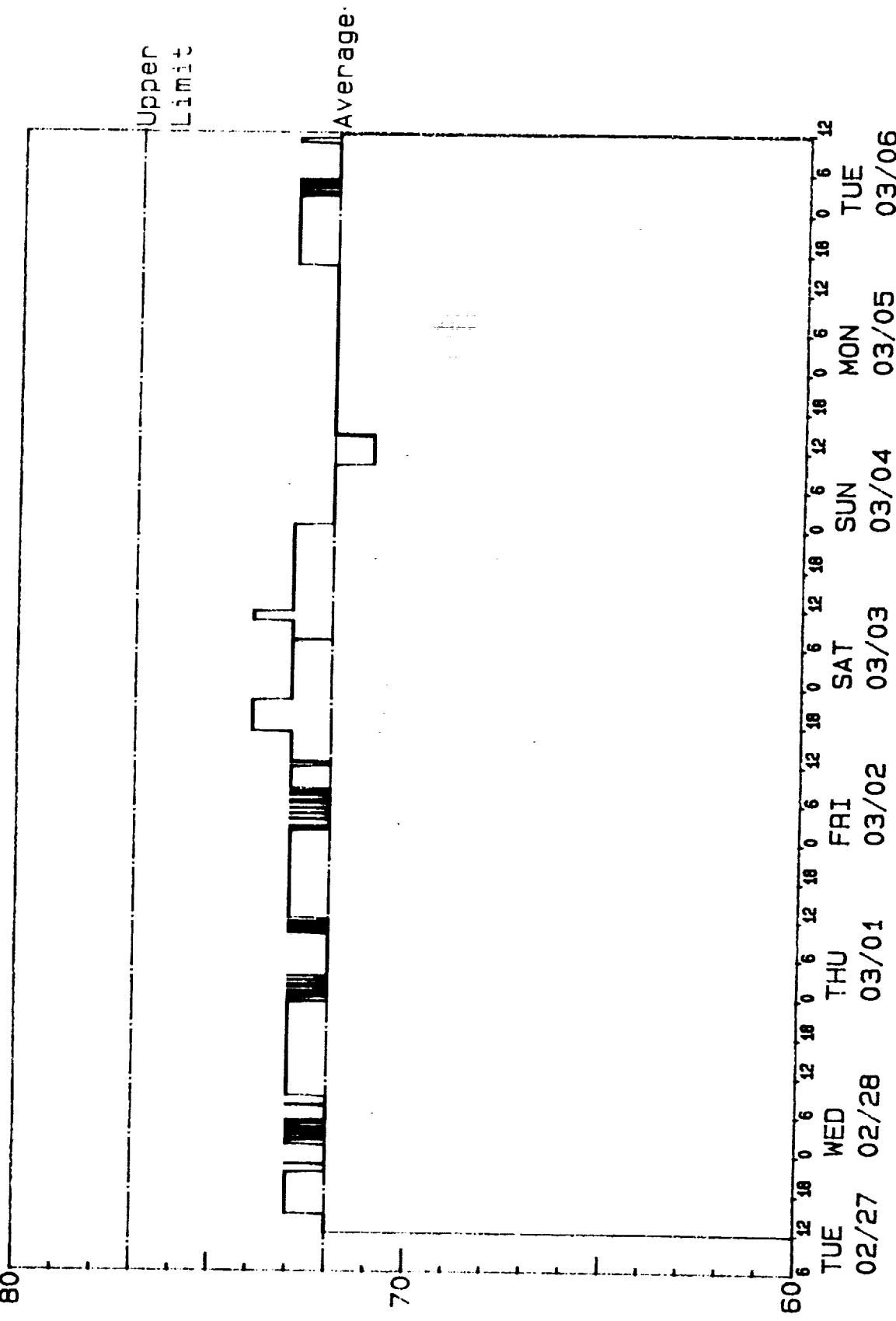


TEMPERATURE VS TIME

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C10)

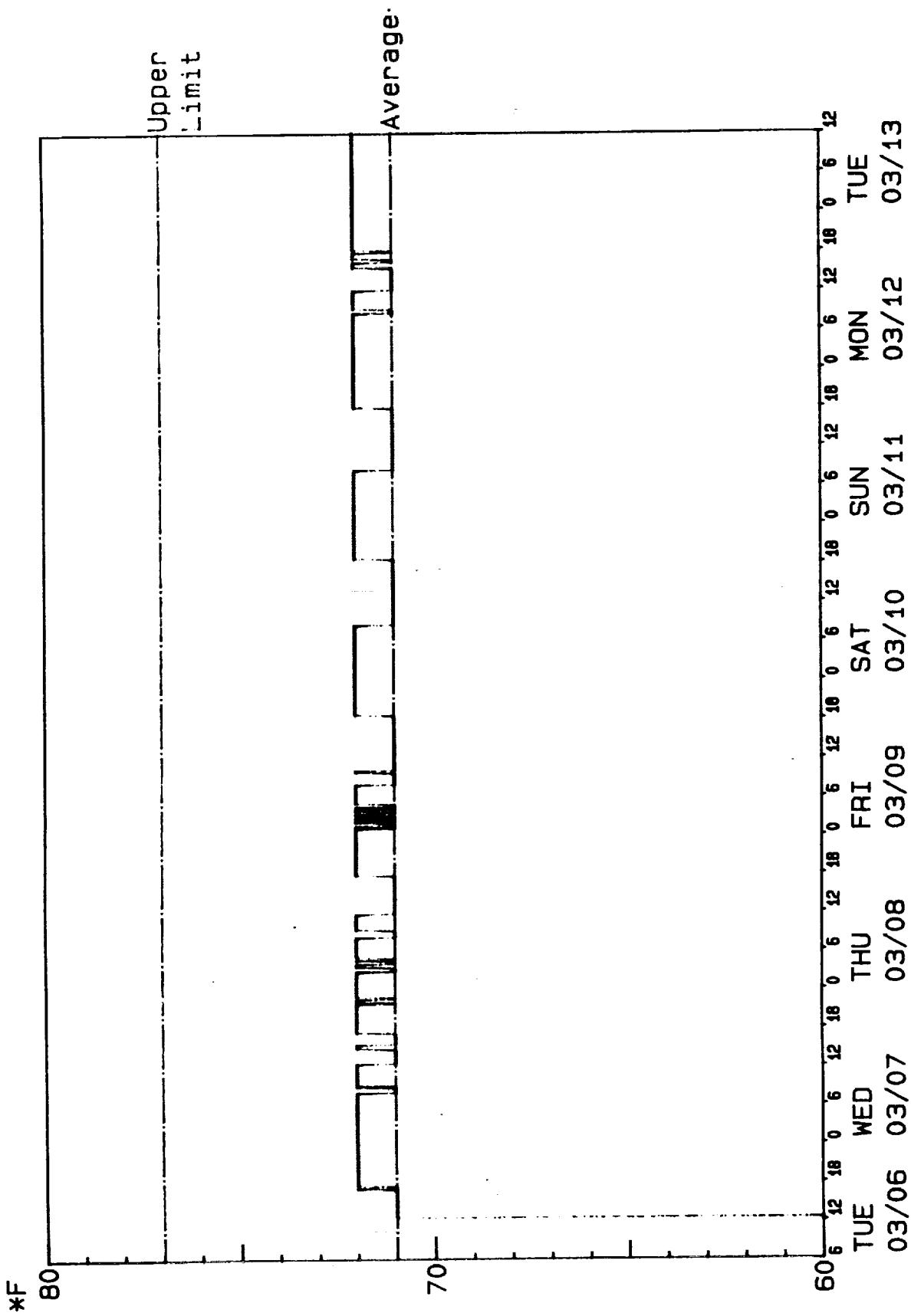
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TEMPERATURE VS TIME

FACILITY: SAEF II

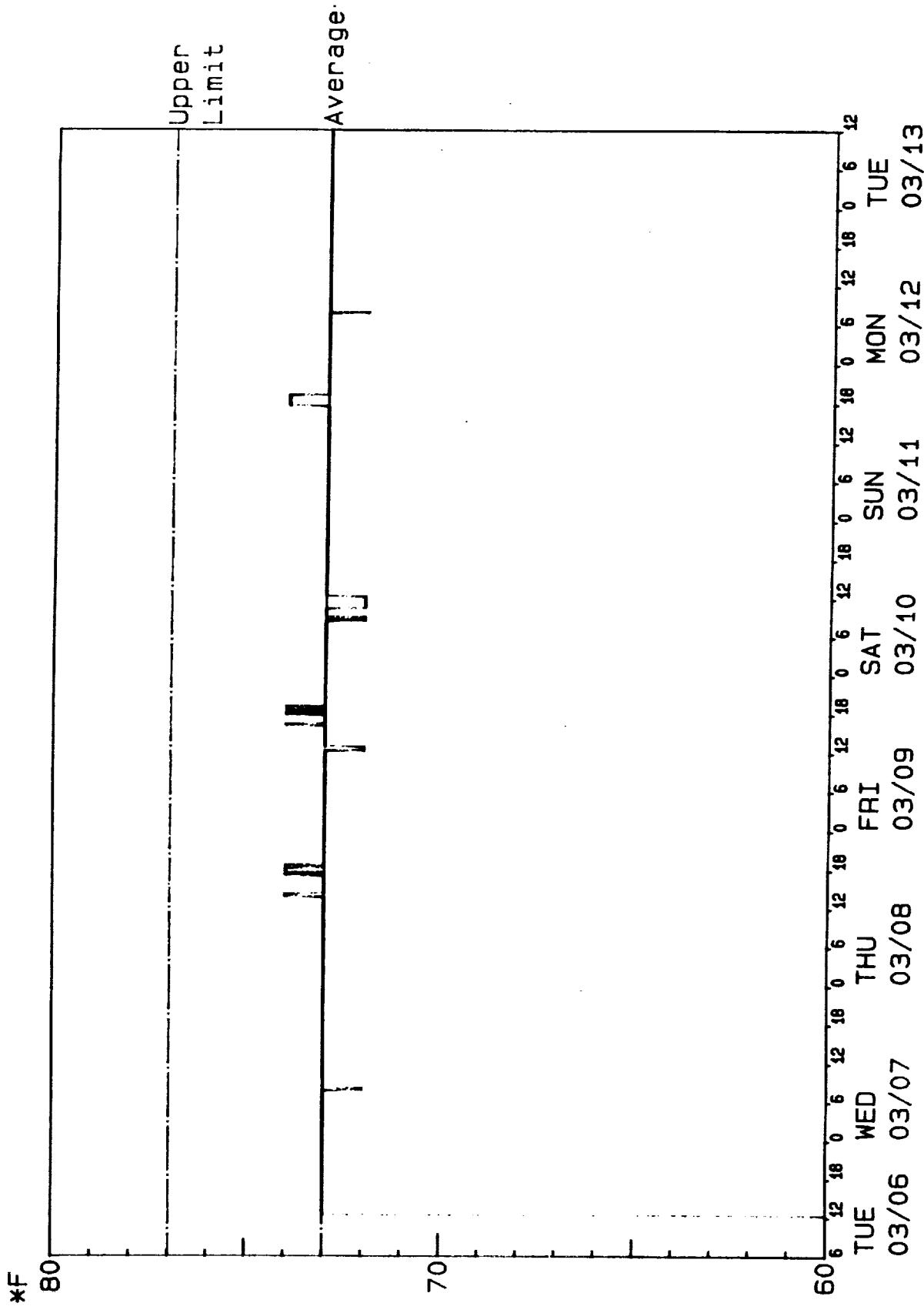
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TEMPERATURE VS TIME

FACILITY: SAEF II

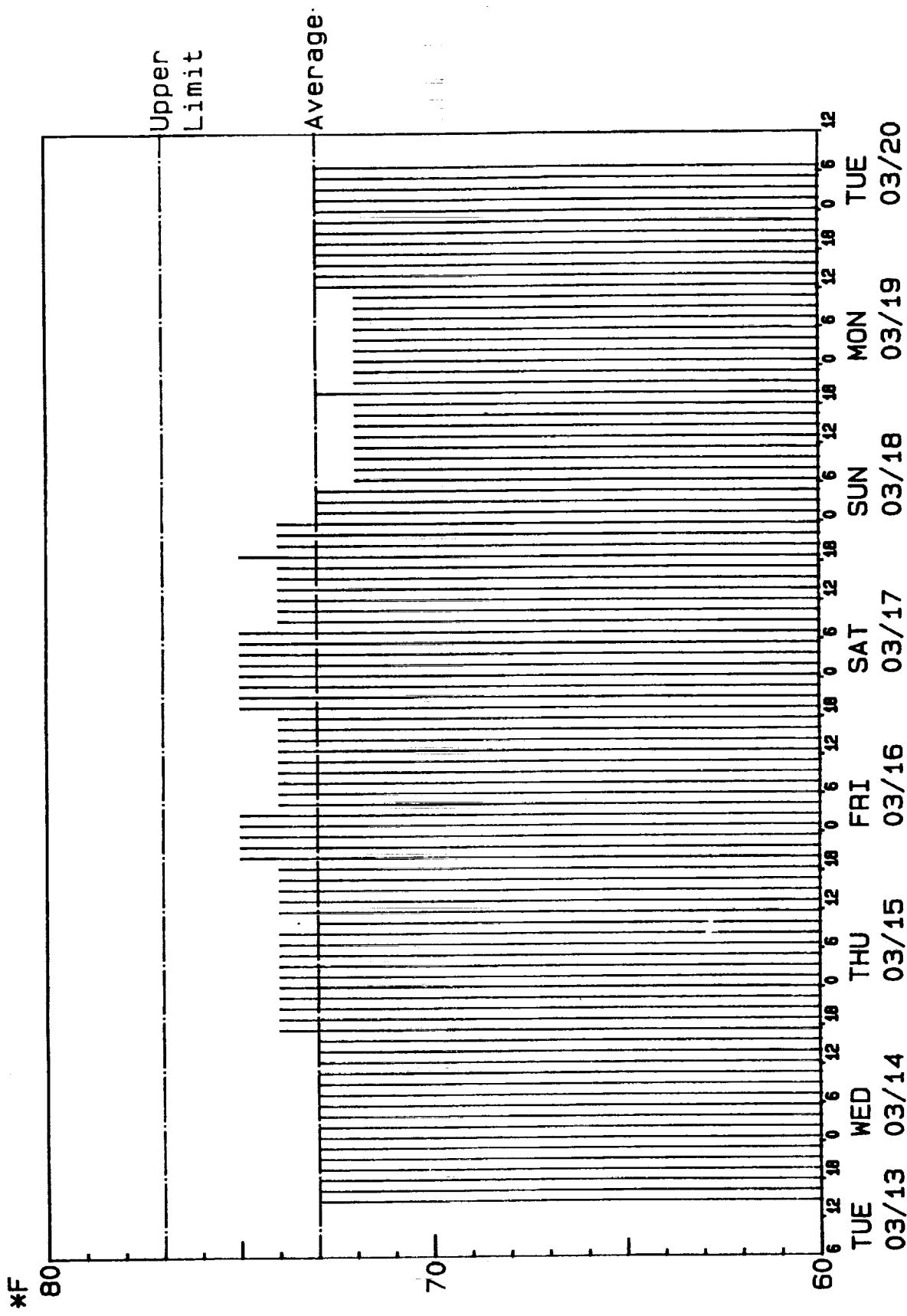
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TEMPERATURE VS TIME

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C10)



TEMPERATURE VS TIME

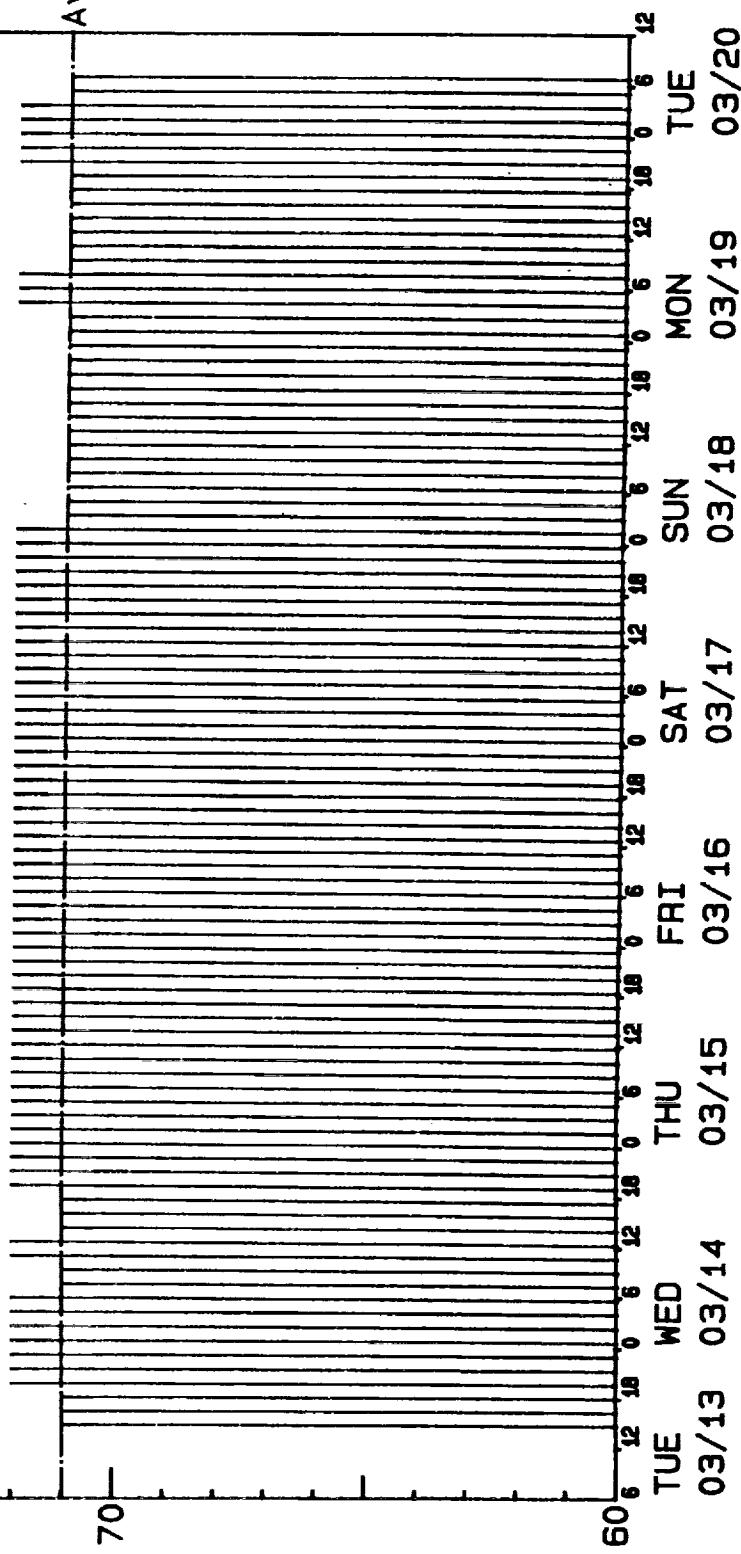
FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C13)

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Upper
Limit

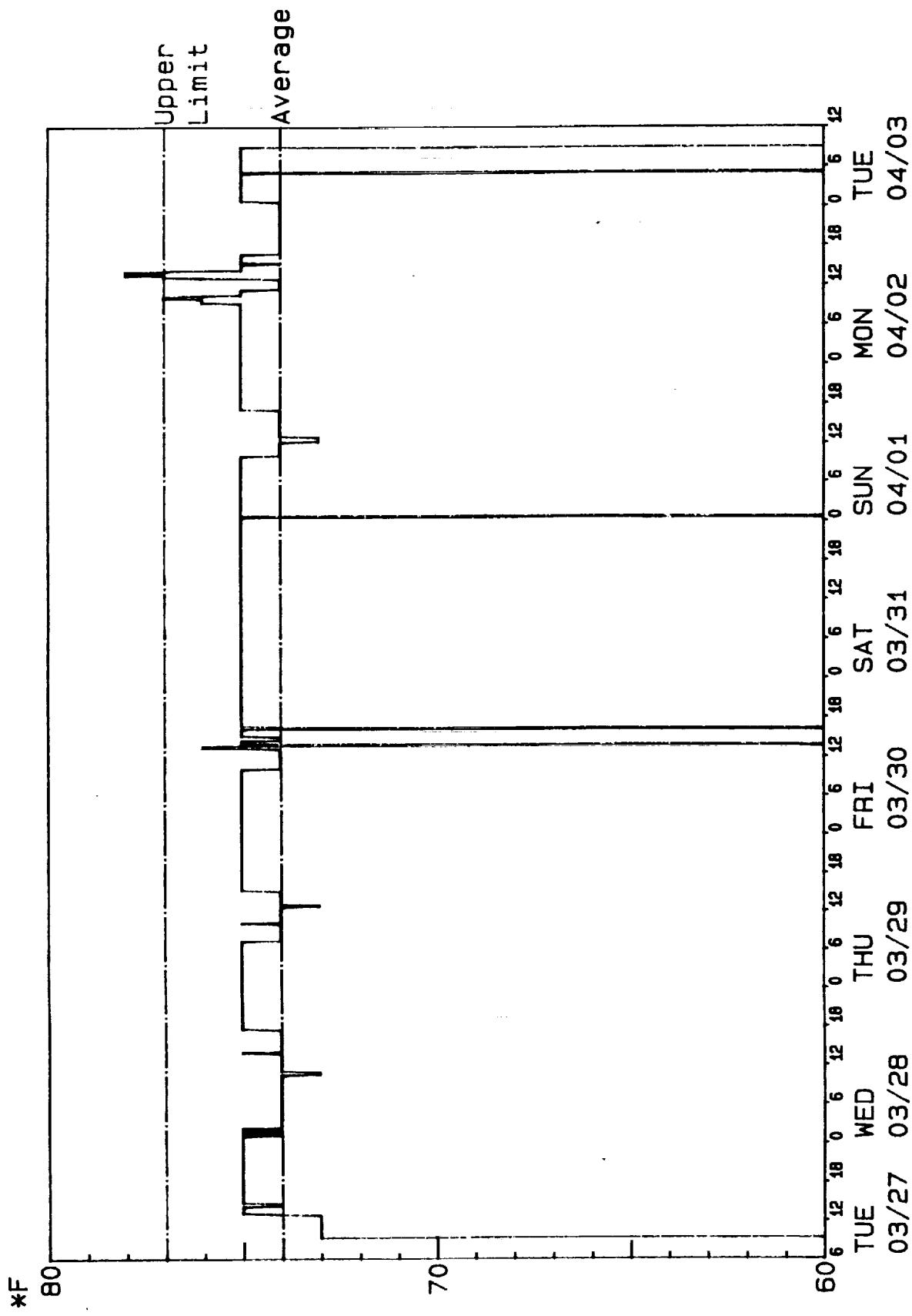
Average



TEMPERATURE VS TIME

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C10)



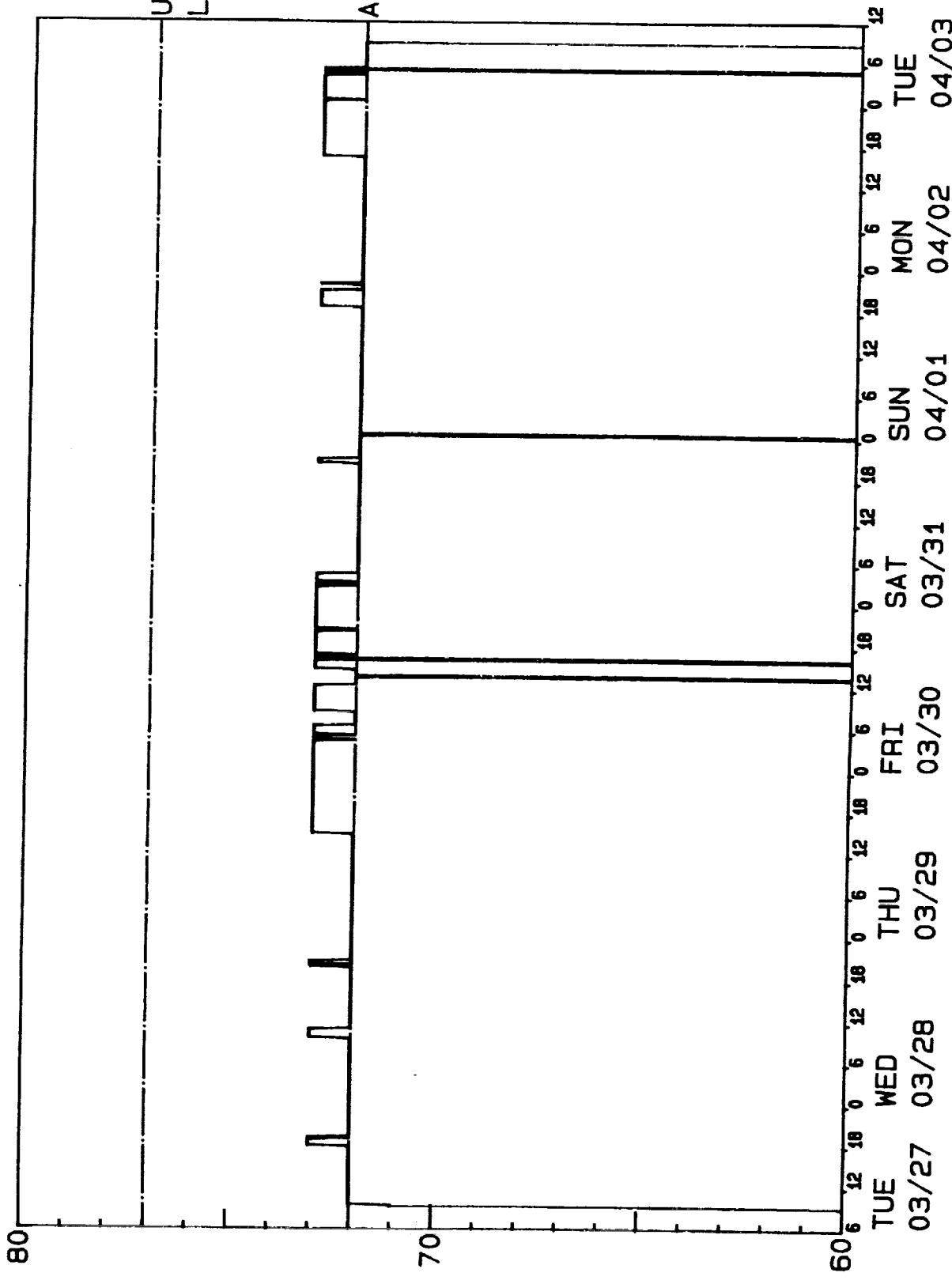
TEMPERATURE VS TIME

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C13)

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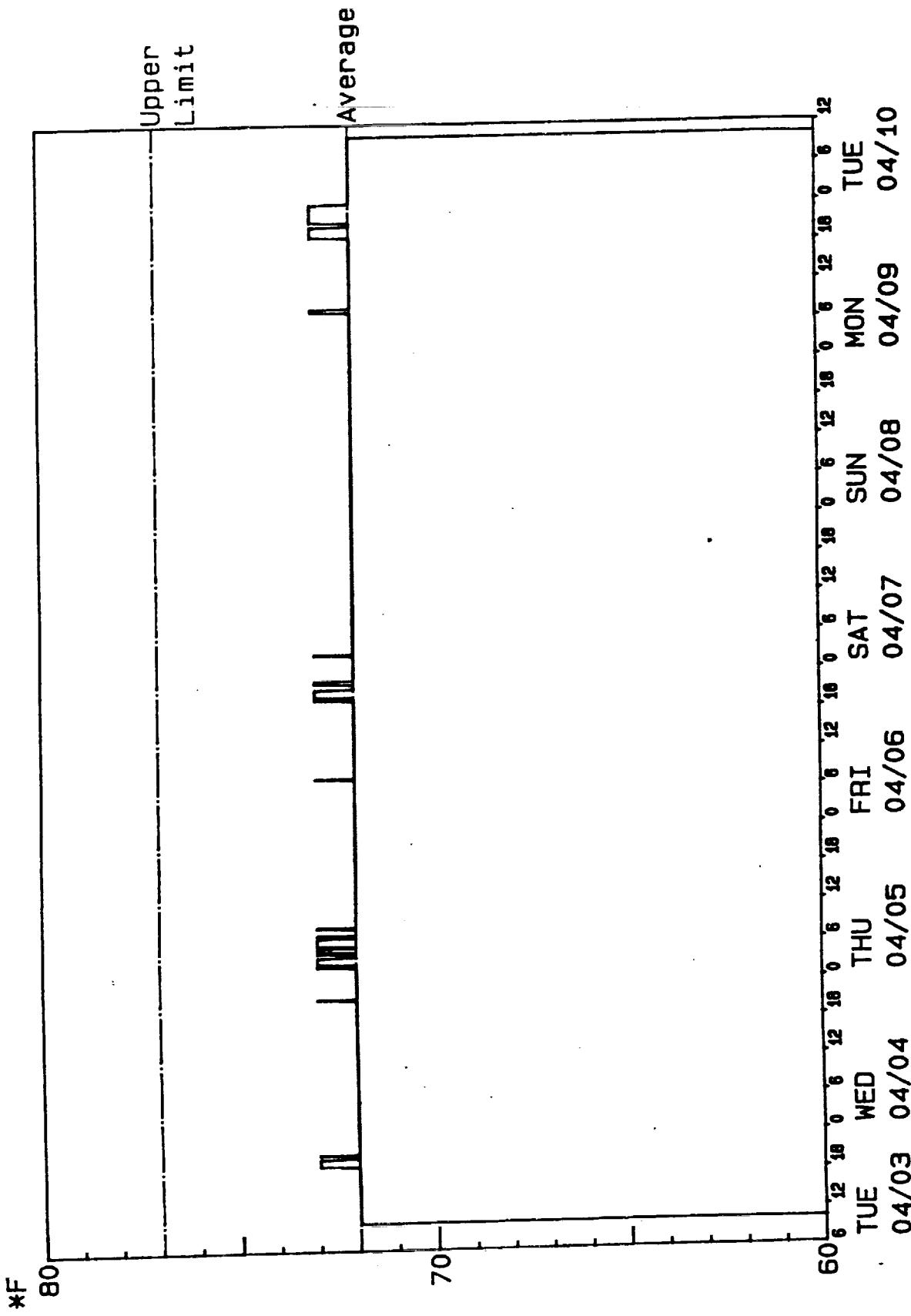
Average

Upper
Limit

TEMPERATURE VS TIME

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C13)

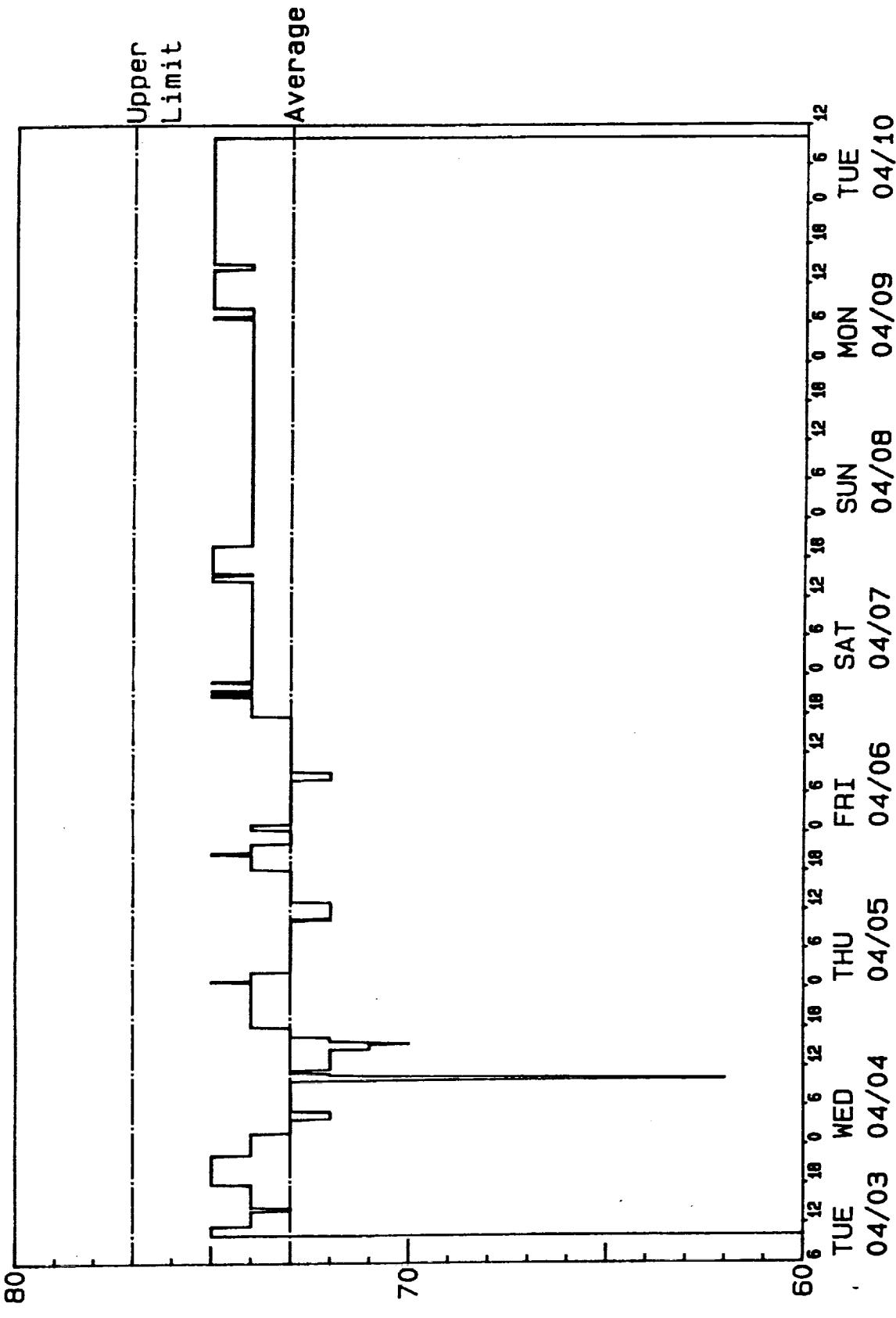


TEMPERATURE VS TIME

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C10)

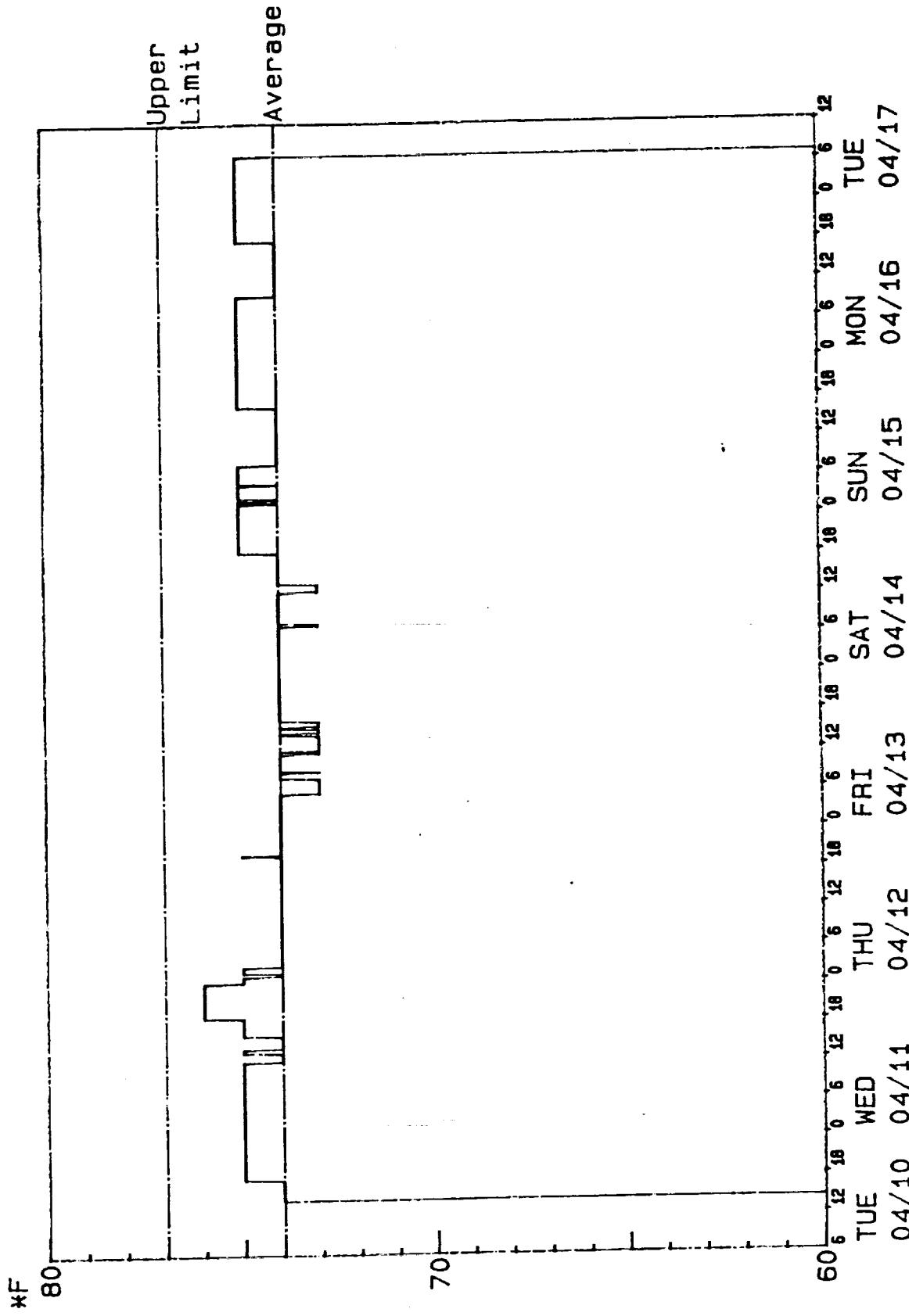
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TEMPERATURE VS TIME

FACILITY: SAEF II

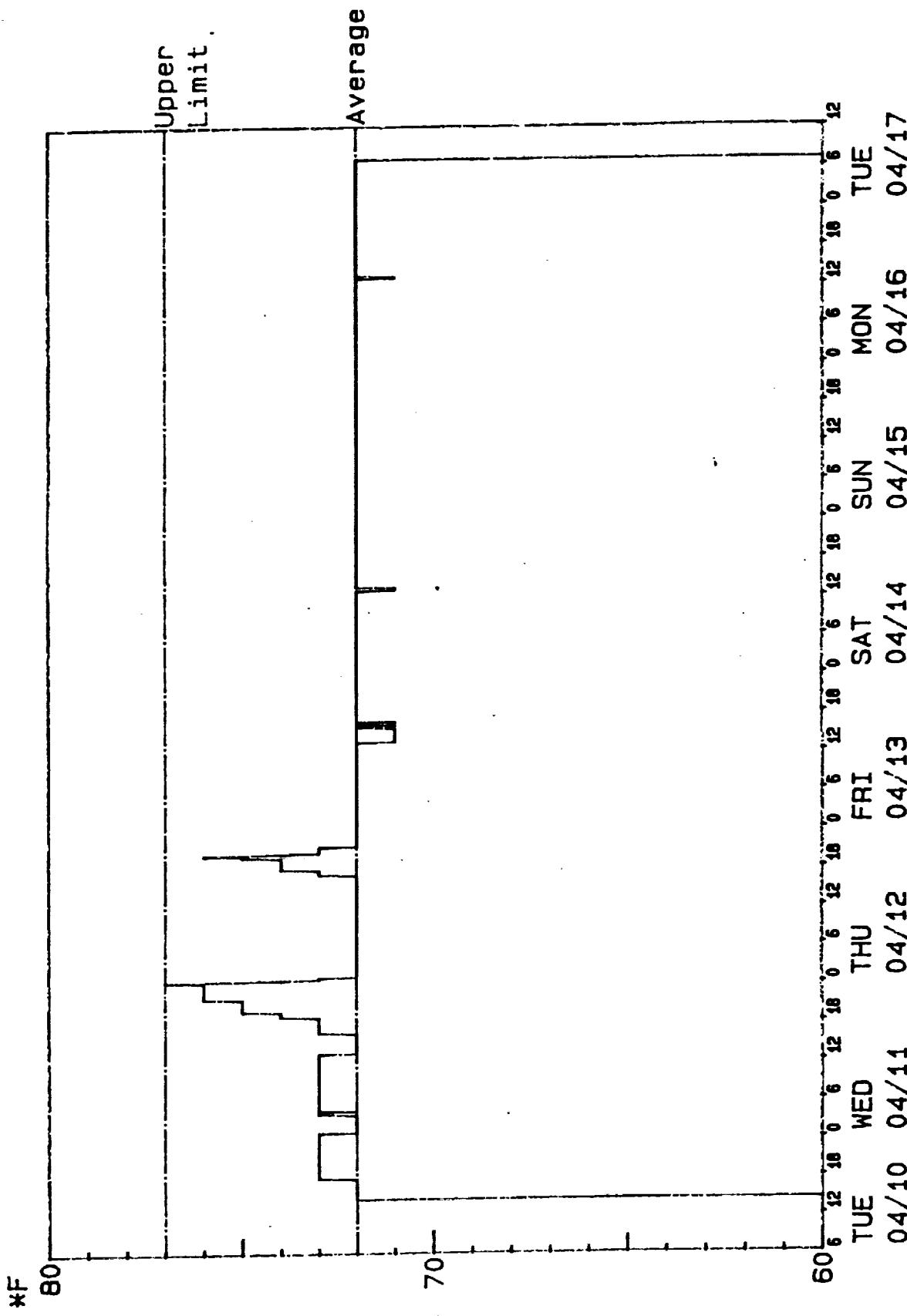
SITE: AIRLOCK EAST WALL (C10)



TEMPERATURE VS TIME

FACILITY: SAEF II

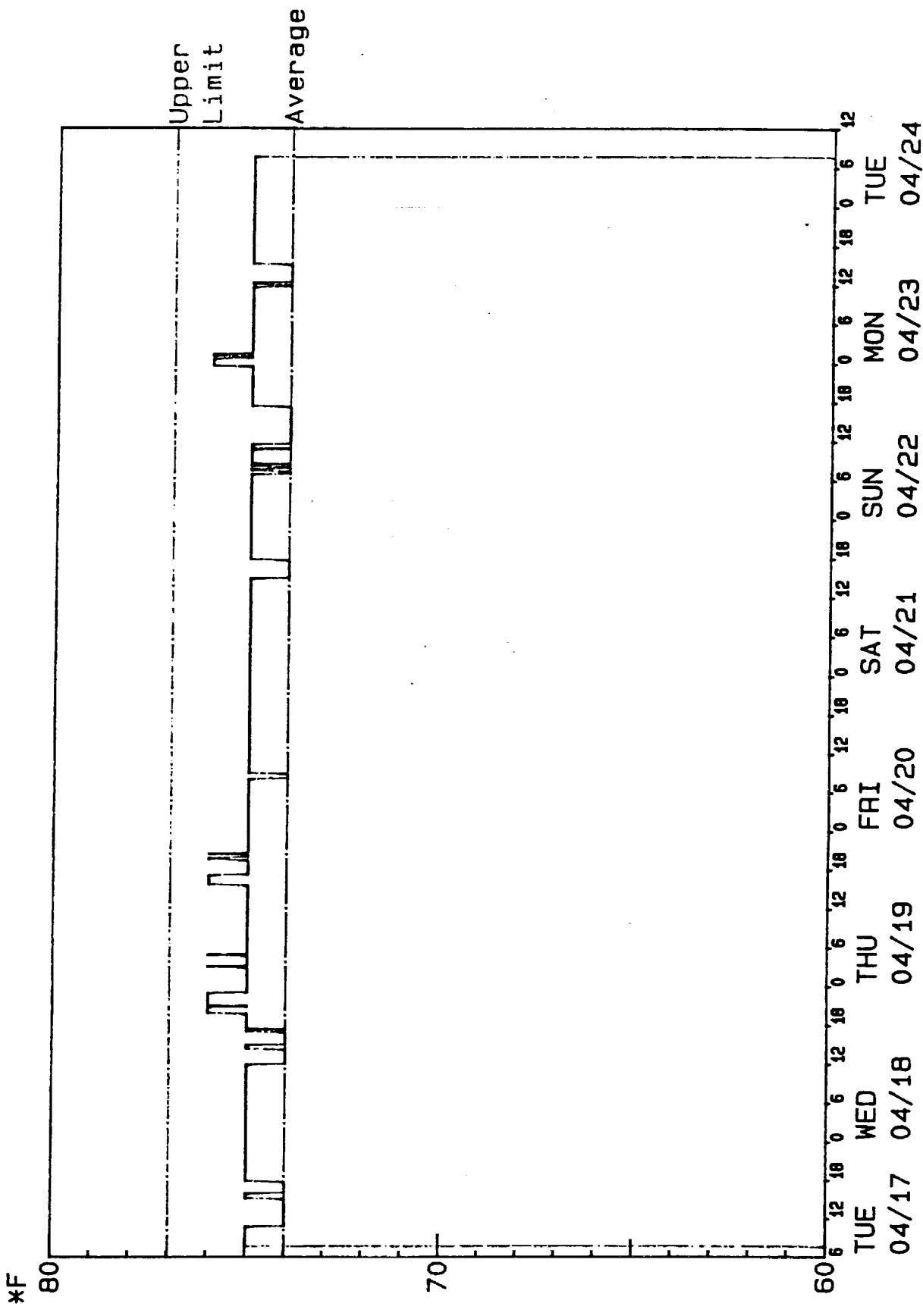
SITE: HIGH BAY EAST WALL (C43)



TEMPERATURE VS TIME

FACILITY: SAEF II

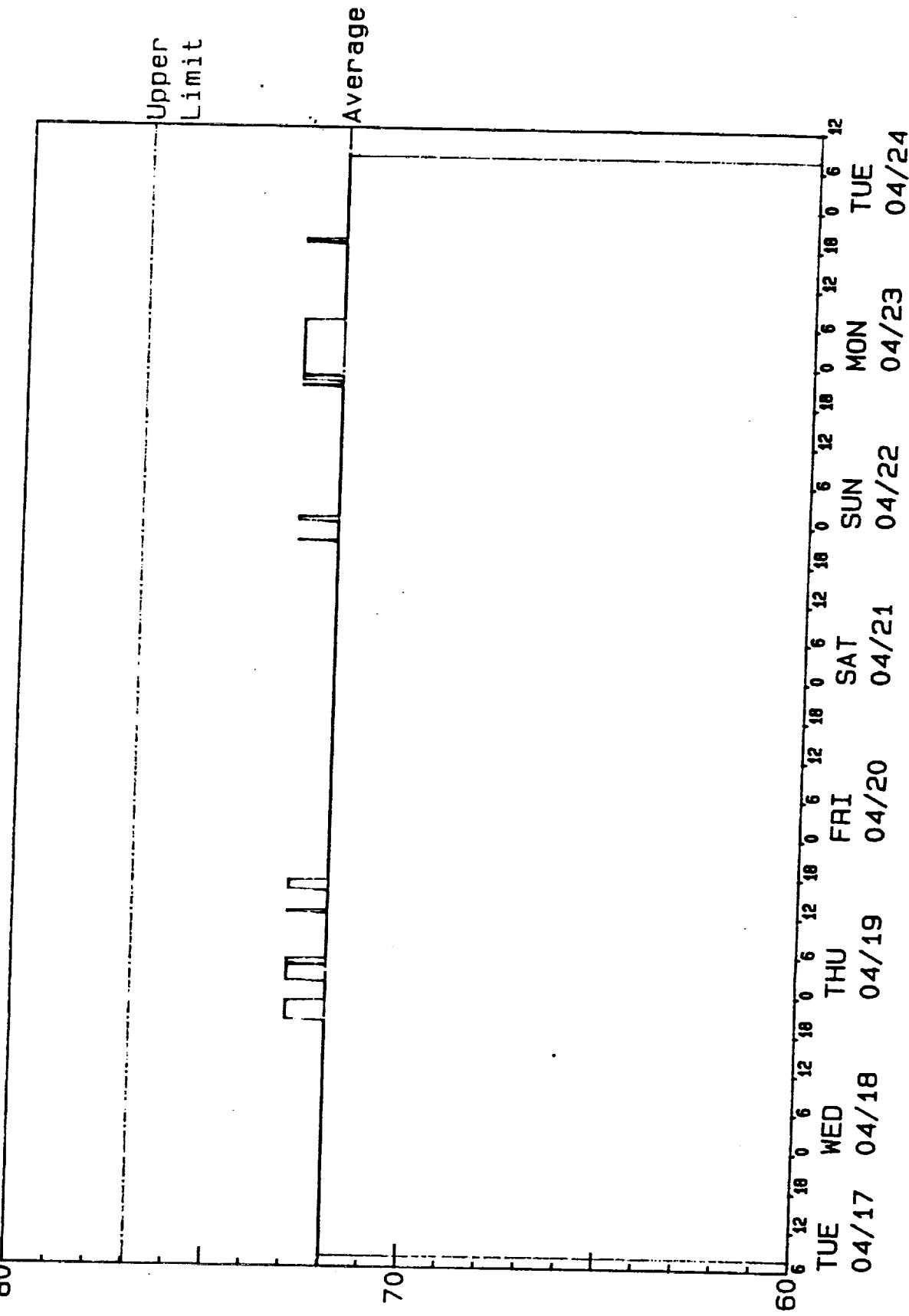
SITE: AIRLOCK EAST WALL (C10)



TEMPERATURE VS TIME

FACILITY: SAEF II

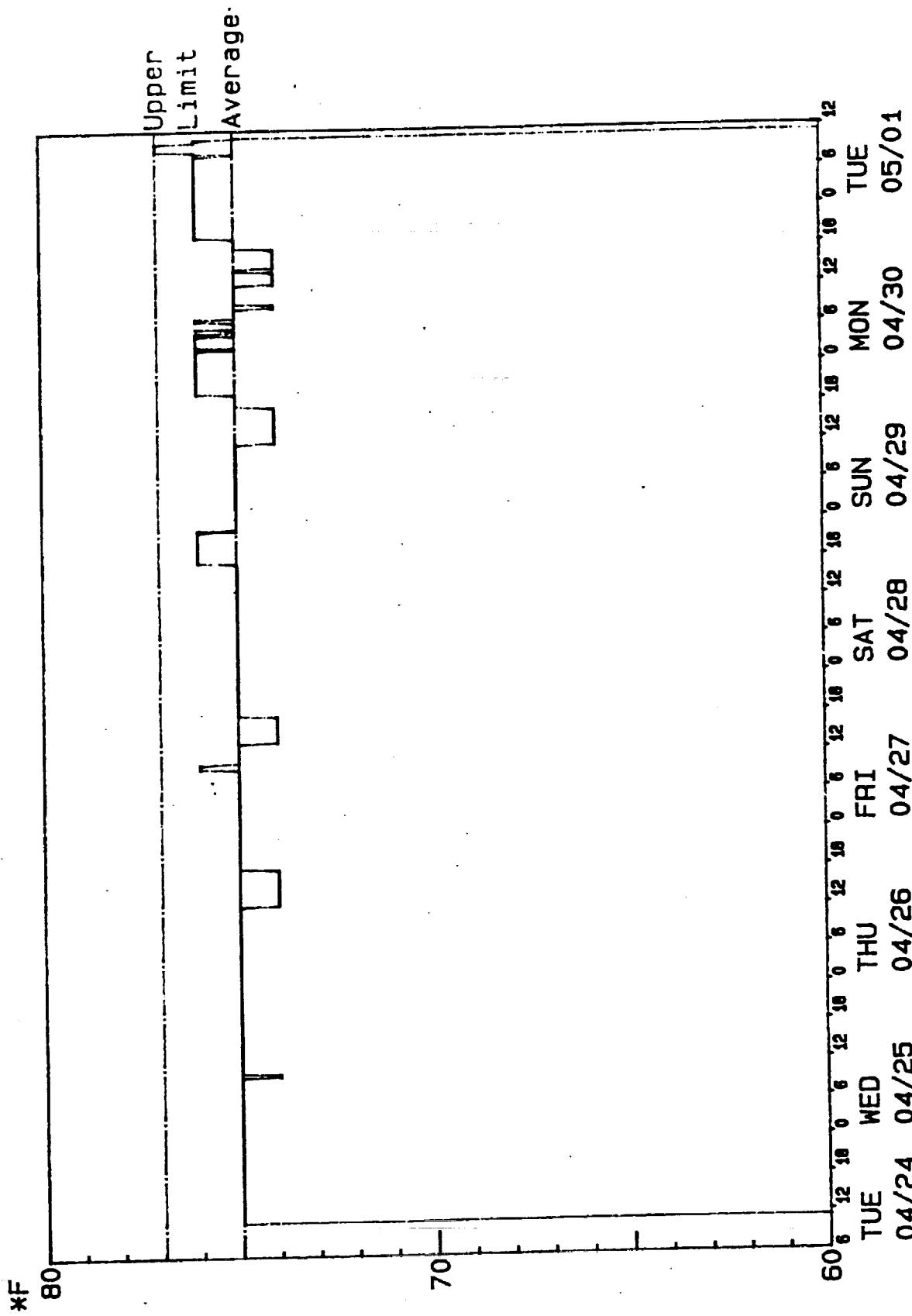
SITE: HIGH BAY EAST WALL (C13)



TEMPERATURE VS TIME

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C10)

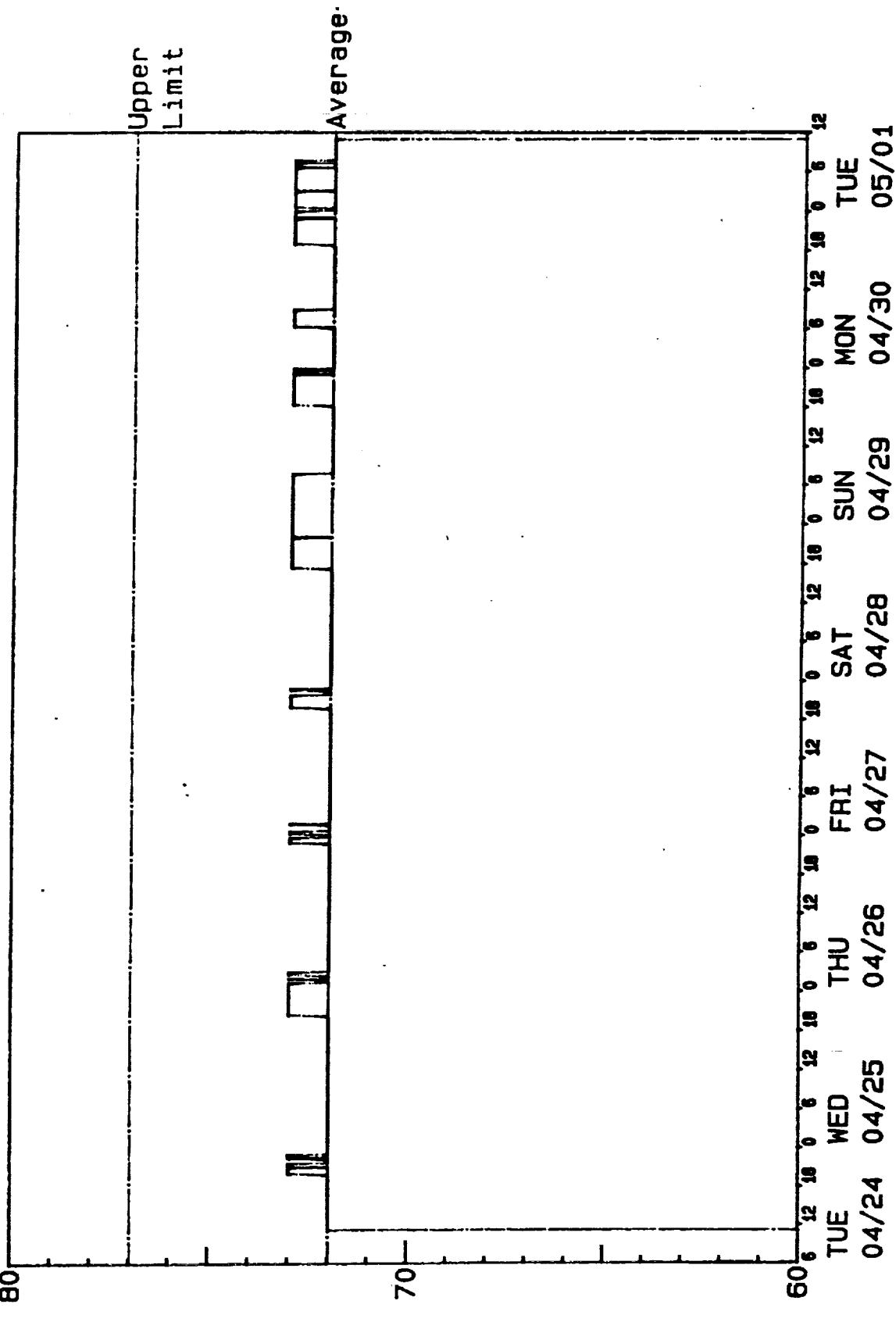


TEMPERATURE VS TIME

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C13)

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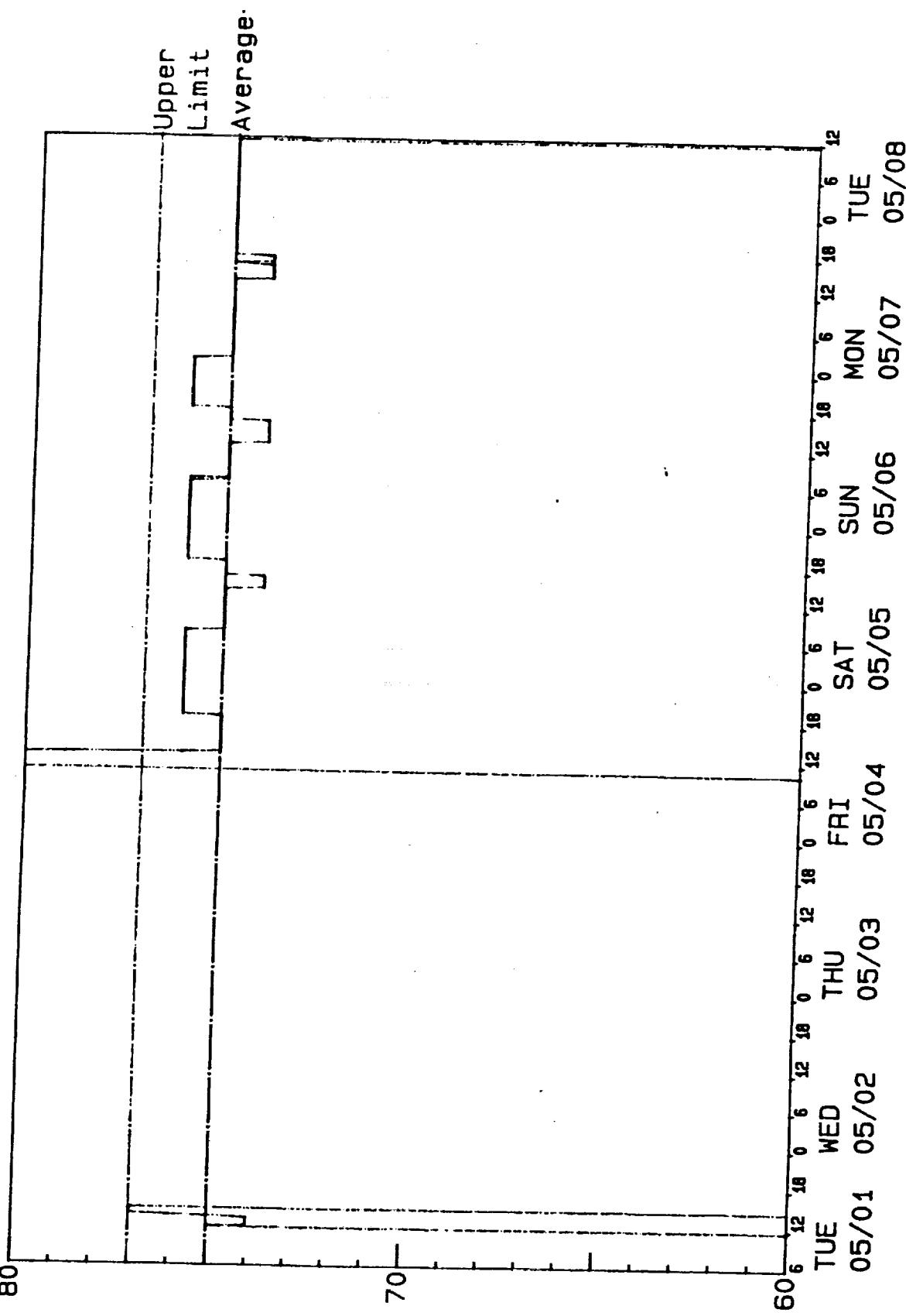


TEMPERATURE VS TIME

FACILITY: SAEF II

SITE: AIRLOCK EAST WALL (C10)

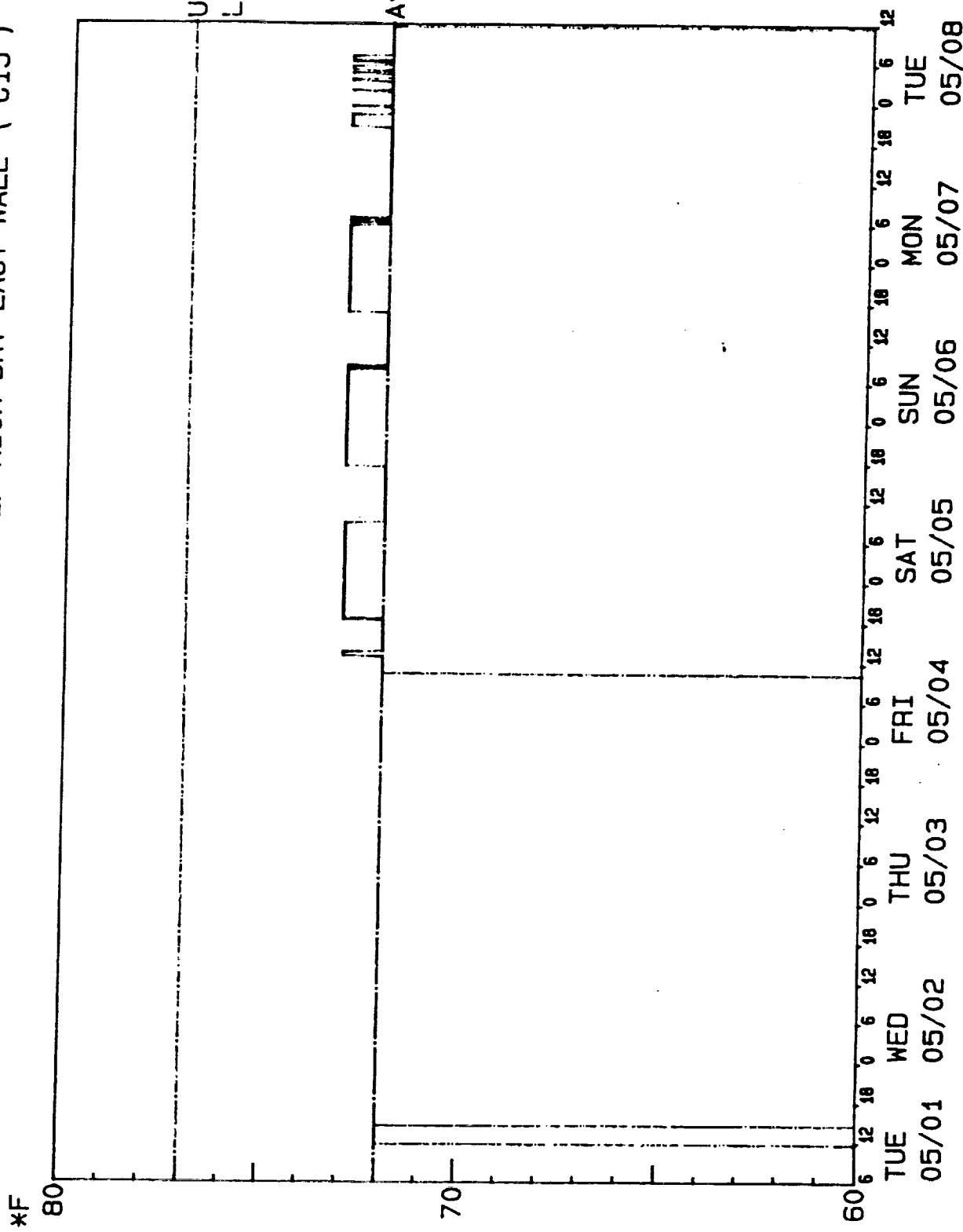
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TEMPERATURE VS TIME

FACILITY: SAEF II

SITE: HIGH BAY EAST WALL (C13)



File: LDEFKITSS

TAPELIFT STATUS

KIT SLIDE SAMPLING	DATE OF	LOCATION OF TAPELIFT	DATE RECEIVED
		(TRAY LOCATION, X & Y COORDINATES, AND DESCRIPTION, INCLUDING EXPERIMENT #)	
1C	1 1-19-90	Edwards, on landing, blanket above purge duct, Stbd	
1C	2 1-19-90	Edwards, on landing, As above, Port side	
1C	3 1-19-90	Edwards, on landing, Sample touched Port purge duct	
1C	4 1-19-90	Edwards, Resample of 1 after PLB Operations	
1C	5 1-19-90	Edwards, Resample of 2 after PLB Operations	
1C	6 1-19-90	Edwards, Resample of 3 after PLB Operations	
1C	7 1-19-90	Edwards, Pre-Ferry, Stbd Blanket near adapter plate	
1C	8 1-19-90	Edwards, Pre-Ferry, Stbd Blanket cent sq one from PSA 1a	
2C	1	KSC, OPF, Resample of 1-08, after lifting OPS	
2C	2	KSC, OPF, Near aft PSA Blanket after lifting OPS	
2C	8	KSC, OPF, Resample of 2-09 after lifting OPS	
2C	9 1-19-90	Edwards, Pre-Ferry, Port Blanket near optical target	
3C	1 2-1-90	OPF, Pre-trans, Fwd base panel below trunion, Port side	
3C	2 2-1-90	OPF, Pre-trans, Fwd base panel below trunion, Stbd side	
3C	3 2-1-90	OPF, Pre-trans,	
3C	4 2-1-90	OPF, Pre-trans, Aft base panel below trunion, Port side	
3C	5 2-1-90	OPF, Pre-trans, Aft base panel below trunion, Stbd side	
3C	7 2-1-90	OPF, Pre-trans, Blank Tape Lift	
4C	1 2-4-90	O&C, Pre-trans, Fwrd sec., LATS Stbd Floor	
4C	2 2-4-90	O&C, Pre-trans, Mid sec., LATS Floor, Stbd side	
4C	3 2-4-90	O&C, Pre-trans, Aft sec., LATS Stbd Floor	
4	4 2-4-90	O&C, Pre-trans, Aft sec., LATS Port Floor	
4C	5 2-4-90	O&C, Pre-trans, Mid sec., LATS Port Floor	
4C	6 2-4-90	O&C, Pre-trans, Fwrd sec., LATS Port Floor	
4C	7 2-4-90	O&C, Pre-trans, Blank Tapelift	
5C	1 2-1-90	O&C, Post-trans, Fwrd base panel below Port Trunion	
5C	2 2-1-90	O&C, Post-trans, Fwrd base panel below Stbd Trunion	
5C	3 2-1-90	O&C, Post-trans, Aft base panel below Port Trunion	
5C	4 2-1-90	O&C, Post-trans, Aft base panel below Stbd Trunion	
5C	5 2-1-90	O&C, Post-trans, Blank Tapelift	
5C	6 2-1-90	O&C, Post-trans, SYNCOM Cradle	
5C	7 2-1-90	O&C, Post-trans, SYNCOM Cradle	
5C	8 2-1-90	O&C, Post-trans, SYNCOM Cradle	
5	9 2-1-90	O&C, Post-trans, SYNCOM Cradle	
6C	1 2-4-90	SAEF-2, Post-trans, Fwrd sec., LATS Stbd Floor	
6C	2 2-4-90	SAEF-2, Post-trans, Mid sec., LATS Stbd Floor	
6C	3 2-4-90	SAEF-2, Post-trans, Aft sec., LATS Stbd Floor	
6C	4 2-4-90	SAEF-2, Post-trans, Aft sec., LATS Port Floor	
6C	5 2-4-90	SAEF-2, Post-trans, Mid sec., LATS Port Floor	
6	6 2-4-90	SAEF-2, Post-trans, Fwrd sec., LATS Port Floor	
6C	7 2-4-90	SAEF-2, Post-trans, Blank Tapelift	
7	1-10	KSC	
8	1-10	KSC	
9C	1 2-1-90	SAEF-2, Pre-LDEF, CleanBench work surface	
9	2 2-1-90	SAEF-2, Pre-LDEF, Tile floor middle area	
9C	3 2-1-90	SAEF-2, Pre-LDEF, Concrete floor middle area	
9	4 2-1-90	SAEF-2, Pre-LDEF, Floor of 8' Platform	
9	5 2-1-90	SAEF-2, Pre-LDEF, Equip Loc, W wall, S Rm.	
9	6 2-1-90	SAEF-2, Pre-LDEF, Tray Hoist	
9	7 2-1-90	SAEF-2, Pre-LDEF, Stairs of 12' Stand	

9C 8 2-1-90 SAEF-2, Pre-LDEF, Mike Box, E Wall
 9C 9 2-1-90 SAEF-2, Pre-LDEF, Krypton Vent pipe, S wall
 9C 10 2-1-90 SAEF-2, Pre-LDEF, LN2 Tanks for GeLi Detectors
 9C 11 2-1-90 SAEF-2, Pre-LDEF, Floor, E wall Observation window
 9C 12 2-1-90 SAEF-2, Pre-LDEF, Video Camera and Stand, air shower
 9C 13 2-1-90 SAEF-2, Pre-LDEF, Forklift
 9C 14 2-1-90 SAEF-2, Pre-LDEF, Floor in front of airlock door, N wall
 9C 15 2-1-90 SAEF-2, Pre-LDEF, Top of Blue Box, W wall
 9C 16 2-1-90 SAEF-2, Pre-LDEF, Top of Ladder Platform, W wall
 9C 17 2-1-90 SAEF-2, Pre-LDEF, Top of check-out Unit, W wall
 9C 18 2-1-90 SAEF-2, Pre-LDEF, Floor near GeLi Detectors
 9C 19 2-1-90 SAEF-2, Pre-LDEF, Floor 10' in front of Obs. Window
 9C 20 2-1-90 SAEF-2, Pre-LDEF, Floor, W side of LDEF Outline
 9C 21 2-1-90 SAEF-2, Pre-LDEF, CleanRoom Shoe Sole after work

10 1 2-9-90 SAEF-2, IMAX, Floor, inside airlock door, W wall
 10C 2 2-9-90 SAEF-2, IMAX, Floor, near Observation window
 10C 3 2-9-90 SAEF-2, IMAX, Floor, W area near air return
 10C 4 2-9-90 SAEF-2, IMAX, LATS between rows D and E, E side
 10C 5 2-9-90 SAEF-2, IMAX, LATS row D, W side, 2 lifts
 10C 6 2-9-90 SAEF-2, IMAX, Floor, edge of LATS, W side
 10 7 2-9-90 SAEF-2, IMAX, Cleanbench work surface (off)
 10C 8 2-9-90 SAEF-2, IMAX, M&D Work station table, W wall
 10C 9 2-9-90 SAEF-2, IMAX, Concrete Floor, E wall near phone
 10C 10 2-9-90 SAEF-2, IMAX, Clean Room Shoe Sole after work, 2 lifts
 10 11 2-9-90 SAEF-2, IMAX, Table top, W wall near Emg. Exit
 10 12 2-9-90 SAEF-2, IMAX, Table in NW Corner, Camera Stuff
 10 13 2-9-90 SAEF-2, IMAX, Video Camera and stand near Air Shower
 10 14 2-9-90 SAEF-2, IMAX, Fiber on box #175B, near Air Shower
 10C 15 2-9-90 SAEF-2, IMAX, Floor of 8' Platform, NW Corner

11 1 2-15-90 SAEF-2, 4 LIFTS, TABLE NEAR MIDDLE AIR RETURN COLUMN
 11C 2 2-15-90 SAEF-2, 4 LIFTS, RETRACTABLE STAIRS
 11C 3 2-15-90 SAEF-2, 4 LIFTS, TOP OF COMPUTER BENCH, M&D AREA
 11C 4 2-15-90 SAEF-2, 4 LIFTS, TOP OF MEASUREING TABLE, M&D AREA
 11C 5 2-15-90 SAEF-2, 4 LIFTS, TOP OF DOCUMENTATION TABLE, M&D AREA
 11C 6 2-15-90 SAEF-2, 4 LIFTS, LAMINAR FLOW BENCH TABLE, M&D AREA
 11 7 2-15-90 SAEF-2, SELLECTED DEBRIS FROM HYDRAULIC LIFT
 11C 8 2-15-90 SAEF-2, 4 LIFTS, HYDRAULIC LIFT
 11 9 2-15-90 SAEF-2, 4 LIFTS, JACK STRUCTURE, HYDRAULIC LIFT
 11C 10 2-15-90 SAEF-2, 4 LIFTS, SPACE END, RIGHT CORNER OF LATS
 11C 11 2-15-90 SAEF-2, 4 LIFTS, LATS NEXT TO WITNESS PLATE
 11C 12 2-15-90 SAEF-2, 4 LIFTS, LATS EARTH END, OBS.WINDOW SIDE
 11C 13 2-15-90 SAEF-2, 4 LIFTS, FLOOR NEAR EARTH END

12C 1 2-24-90 TRAY D-07 BACKSIDE, ONE LIFT OFF INITIATE BOX (EIS)
 12C 2 2-24-90 TRAY D-07 BACKSIDE, FOUR LIFTS OFF INITIATE BOX (EIS)
 12C 3 2-24-90 TRAY D-07 BACKSIDE, FOUR LIFTS OFF BATTERY BOX
 12C 4 2-24-90 SAEF-2, 4 LIFTS OF FLOOR UNDER PARTICLE COUNTER
 12C 5 2-24-90 SAEF-2, 4 LIFTS FROM PHOTOROOM FLOOR, LEFT OF TRAY
 12C 6 2-24-90 SAEF-2, 4 LIFTS FROM PHOTOROOM WALL, BEHIND TRAY
 12C 7 2-24-90 SAEF-2, 4 LIFTS OF TOP OF PHOTOROOM FILE CABINET
 12C 8 2-24-90 SAEF-2, 4 LIFTS OFF GRILL, FIRST COLUMN NEAR EARTH END
 12C 9 2-24-90 SAEF-2, 4 LIFTS OFF GRILL 90 DEGREES FROM TAPELIFT #8
 12C 10 2-24-90 SAEF-2, 4 LIFTS FROM FLOOR IN FRONT OF NORTH DOOR
 12C 11 2-24-90 SAEF-2, 4 LIFTS FROM FLOOR IN FRONT OF AIR LOCK DOOR
 12C 12 2-24-90 SAEF-2, 4 LIFTS OFF LATS (TRAILER), SOUTHEAST CORNER
 12C 13 2-24-90 SAEF-2, 4 LIFTS OFF LATS, MIDDLE SOUTH SIDE
 12C 14 2-24-90 SAEF-2, 4 LIFTS, LATS SOUTHWEST CORNER (CLOSEST TO CRANE)
 12C 15 2-24-90 SAEF-2, 4 LIFTS, BACK SIDE, TRAY HOLDER #3 (C08)
 12C 16 2-24-90 SAEF-2, 4 LIFTS OFF FLOOR IN FRONT OF NOMARSKI SET-UP

13 1 2-28-90 TRAY D-09, FRAME X130 & Y28, ONE LIFT
 13 2 2-28-90 TRAY D-09, FRAME X110 & Y58, EXP. LIP, ONE LIFT

13 3 2-28-90 TRAY D-09, FRAME X120 & Y102, FRAME RIM, ONE LIFT
 13 4 TRAY E-12, OUTSIDE, AROUND CONNECTOR, A0038
 13 5 TRAY F-06, OUTSIDE, AROUND CONNECTOR
 13 6 TRAY B-03, EXP. A0138, 4 LIFTS, INSIDE BOTTOM
 13 7 TRAY B-03, EXP. A0138, 1 LIFT, LOWER LEFT SIDE
 13 8 TRAY B-03, EXP. A0138, 2 LIFTS, UPPER LEFT WIRE MESH
 13 9 TRAY B-03, EXP. A0138, 4 LIFTS, INSIDE
 13 10 TRAY B-03, EXP. A0138,
 13 11 TRAY B-03, EXP. A0138,
 13 12 TRAY B-03, EXP. A0138,
 13 13 TRAY B-03, EXP. A0138,
 13 14 TRAY B-03, EXP. A0138,
 13 15 TRAY B-03, EXP. A0138,
 13 16 TRAY B-03, EXP. A0138,
 13 17 TRAY B-12, EXP. A0201, BROWN DEPOSIT
 13 18 TRAY B-12, EXP. A0201, OXIDIZED PAINT, BTM EDGE, COVER
 13 19 TRAY B-12, EXP. A0201, RED PWDR, INSIDE FRAME ON BLK TC
 13 20 TRAY G-06, COVER PLATE DARK AREA
 13 21 TRAY G-06, COVER PLATE LIGHT AREA
 13 22 SAEF-2, SCAFFOLDING, A ROW OF LDEF
 13 23 SAEF-2, SCAFFOLDING, C ROW OF LDEF
 13 24 SAEF-2, SCAFFOLDING, E ROW OF LDEF
 13 25 SAEF-2, SCAFFOLDING, H END OF LDEF

14 1 2-27-90 SAEF II, 4 LIFTS, FLOOR UNDER PARTICLE COUNTER
 14C 2 2-27-90 SAEF II, 4 LIFTS, PHOTOROOM FLOOR IN FRONT OF OUTER DOOR
 14 3 2-27-90 SAEF II, 4 LIFTS, DOOR IN PHOTOROOM TO OUTSIDE
 14 4 2-27-90 SAEF II, 4 LIFTS, FLOOR UNDER DESK IN PHOTOROOM
 14 5 2-27-90 SAEF II, 4 LIFTS, LAT5, SOUTHEAST CORNER
 14 6 2-27-90 SAEF II, 4 LIFTS, LAT5, SOUTH SIDE MIDDLE
 14 7 2-27-90 SAEF II, 4 LIFTS, LAT5, SOUTHWEST CORNER
 14C 8 2-27-90 SAEF II, 4 LIFTS, FLOOR UNDER CRANE
 14 9 2-27-90 SAEF II, 4 LIFTS, FLOOR JUST OUTSIDE OF M & D SIG AREA
 14C 10 2-27-90 SAEF II, 4 LIFTS, HORIZ. BAR BETWEEN TABLE LEGS IN M&D
 14 11 2-27-90 SAEF II, 4 LIFTS, WALL NEXT TO OUTSIDE DOOR IN M&D
 14 12 2-27-90 SAEF II, 4 LIFTS, FLOOR IN FRONT OF NOMARSKI SET-UP
 14 13 2-27-90 SAEF II, 4 LIFTS, METAL CART WITH THE MONITOR FOR NOMARS
 14 14 2-27-90 FOUR LIFTS OFF THIRD WORK TABLE FROM EAST WALL
 14 15 2-27-90 AIRLOCK, 4 LIFTS, TOP SURFACE OF PAINTED WOODEN BOX
 14 16 2-27-90 AIRLOCK, 4 LIFTS, OFF CONTAINERS EXPOSED FOR 2-DAYS
 14 17 2-27-90 AIRLOCK, 4 LIFTS OFF FLOOR
 14C 18 2-27-90 SAEF-2, 4 LIFTS OFF FLOOR IN TRAY PACKAGEING AREA

15 1

16 1

17 1-15 FRANCE

18 1-15 FRANCE

19 1

20 1

20 2

20 3

20 4

21 1-25 Aerospace

22 1 3-1-90 LDEF, 1 LIFT, HORIZONTAL I-BEAM UNDER M0002-1 OF D03
 22 2 3-1-90 SAEF-2, TOP OF INSTRUMENT CART
 22C 3 3-1-90 SAEF-2, FLOOR CLEANROOM SIDE OF AIRLOCK
 22 4 3-1-90 SAEF-2, FLOOR IN FRONT OF AIR EXHAUST VENT NEAR AIRLOCK

22 5 3-1-90 SAEF-2, SURFACE OF SHIPING CONTAINER
22C 6 3-1-90 SAEF-2, SHELF INSIDE STORAGE CABINET
22 7 3-1-90 SAEF-2, FLOOR UNDER TELEPHONE NEAR EXIT
22C 8 3-1-90 SAEF-2, SHELF INSIDE BAG STORAGE CABINET
22C 9 3-1-90 SAEF-2, TOP OF TV MONITOR
22C 10 3-1-90 SAEF-2, RETURN AIR VENT, MSIG AREA
22 20 3-1-90 USED AS A COVER FOR SLIDE #1

23 1

24C 1 LATS FLOOR, 4 LIFTS, CENTER, EAST SIDE
24 2 SAEF-2, 4 LIFTS, TRAY ROTATOR,
24C 3 SAEF-2, FLOOR UNDER PARTICLE COUNTER
24C 4 LATS, 4 LIFTS, SPACE END
24 5 SAEF-2, 1 LIFT, TRAY HOIST FIXTURE WINCH
24 6 SAEF-2, 3 LIFTS, FLOOR OUTSIDE PHOTO ROOM
24 7 STORAGE BOX FLY
24 8 TRAY ?-03, EXP A0187-1, DRIP EPOXY SCRAPING INSIDE TRAY
24 9 TRAY H7, POWDER UNDER
24 10 Tray B-8, A0056
24 11 Tray B-8, A0056
24 12 Tray B-8, A0056
24 13 Tray B-8, A0056
24 14 Tray G-12,
24 15 Tray B-8, M0004
24 16 Tray B-8, A0147

24 17

24 18 Tray G-2

24 19

24 20 TRAY F-08, LOOSE FLAKE OF FILM, CORNER

25 1

26 1

27 1 LDEF, SHADOW OF LEFT THIRD COVER, BOTTOM TRAY
27 2 LDEF, SHADOW OF LEFT THIRD COVER, BOTTOM TRAY
27 3 LDEF, VARIOUS IMPACTS AND DEBRIS, TRAY
27 4 LDEF, SHADOW, UPPER LT OUTSIDE, TRAY
27 5 LDEF, SHADOW, UPPER LT OUTSIDE, TRAY
27 6 LDEF, 2 LIFTS, BACKSIDE OF TRAY
27 7 TRAY H-03, EXP. M0001,
27 8 TRAY H-03, EXP. M0001,
27 9 TRAY H-03, EXP. M0001,
27 10 3-19-90 SAEF-2, 1 LIFT, FLOOR IN FRONT OF RETURN AIR VENT
27 11 3-19-90 SAEF-2, 1 LIFT, SEAM OF PACKAGING CRATE AT AIRLOCK
27 12 3-19-90 SAEF-2, 4 LIFTS, STAIRS UP TO PLATFORM

27 13

27 14

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27 19

27 20

28 1

29 1 4-14-90 LDEF, 1 LIFT, UNDER CLAMP C-03.4
29 2 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP C-03.4
29 3 4-14-90 LDEF, 4 LIFT, NEXT TO CLAMP C-03.4
29 4 4-14-90 LDEF, 4 LIFTS, LONG. 2-3 AT ROW C
29 5 4-14-90 LDEF, LIFT, LONG. 10-11 AT ROW F
29 6 4-14-90 LDEF, 1 LIFT, UNDER CLAMP D-10.4

29 7 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP D-10.4
 29 8 4-14-90 LDEF, 4 LIFT, NEXT TO CLAMP D-10.4
 29 9 4-14-90 LDEF, 1 LIFT, BLACK PAINT AFTER SWAB, D-10
 29 10 4-14-90 LDEF, 1 LIFT, UNDER CLAMP F-06.6
 29 11 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP F-06.6
 29 12 4-14-90 LDEF, 1 LIFT, HOLE AND WASHER DEBRIS, CLAMP F-06.6
 29 13 4-14-90 LDEF, 4 LIFT, NEXT TO CLAMP F-06.6
 29 14 4-14-90 LDEF, 4 LIFT, NEXT TO CLAMP F-06.8, 2 IMPACTS
 29 15 4-14-90 LDEF, 1 LIFT, UNDER CLAMP F-06.8
 29 16 4-14-90 LDEF, 1 LIFT, UNDER CLAMP E-06.4
 29 17 4-14-90 LDEF, 1 LIFT, BETWEEN E-06 AND F-06
 29 18 4-14-90 LDEF, 1 LIFT, EAGLE HEAD PATTERN, LONG. 6-5, ROW E
 29 19 4-14-90 LDEF, 1 LIFT, UNDER CLAMP B-05.4
 29 20 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP B-05.4

30 1 4-14-19 LDEF, LONG. ROW B COL.4-5, SHADOW
 30 2 4-14-19 LDEF, SPACE END CHANNEL AROUND CORNER FROM F-6
 30C 3 4-14-19 LDEF, 4 LIFTS, SQUARE BETWEEN E-F AND 1-12
 30 4 4-14-19 LDEF, C-09, UNDER SCREW HOLES
 30 5 4-14-19 LDEF, C-03, UNDER SCREW HOLES
 30 6 4-14-19 LDEF, C-03, 4 LIFTS, TRAY COVER
 30C 7 4-14-19 LDEF, C-09, 4 LIFTS, TRAY COVER
 30C 8 4-14-19 LDEF, INITIATOR BOX, 1 LIFT
 30C 9 4-14-19 LDEF, INITIATOR BOX, 4 LIFTS
 30 10 4-14-19 LDEF, BRACE BETWEEN B AND C 7, 1 LIFT, UNDER CLAMP
 30C 11 4-14-19 LDEF, BRACE BETWEEN B AND C 7, 1 LIFT, EXPOSED
 30C 12 4-14-19 LDEF, BRACE BETWEEN B AND C 7, 4 LIFT, EXPOSED
 30 13 4-14-19 SAEF-2, TRAY ROTATOR, ORG WINCH BASE, RED BLOCK BELOW
 30 14 4-14-19 SAEF-2, 4 LIFTS, TRAY ROTATOR CABLE
 30C 15 4-14-19 LDEF, 4 LIFTS, INERTIAL CONTOL UNIT
 30 16 4-14-19 LDEF, AROUND BOLT, G-03
 30 17 4-14-19 LDEF, 1 LIFT, G-12, UNDER LOWER CENTER CLAMP
 30 18 4-14-19 LDEF, 1 LIFT, G-12, EXPOSED

31C 1 3-27-90 LATS, 4 LIFTS,
 31C 2 3-27-90 LATS, 4 LIFTS,
 31C 3 3-27-90 LATS, 4 LIFTS,
 31C 4 3-27-90 SAEF-2, 4 LIFTS,
 31C 5 3-27-90 SAEF-2, 4 LIFTS,
 31 6 3-29-90 SAEF-2, 4 LIFTS,
 31 7 3-29-90 SAEF-2, 4 LIFTS,
 31C 8 3-29-90 SAEF-2, 4 LIFTS,
 31C 9 3-29-90 SAEF-2, 4 LIFTS,
 31 10 3-29-90 SAEF-2, 4 LIFTS,
 31 11 3-29-90 SAEF-2, 4 LIFTS,
 31 12 3-29-90 SAEF-2, 4 LIFTS,
 31 13 3-29-90 SAEF-2, 4 LIFTS,
 31 14 3-29-90 SAEF-2, 4 LIFTS,
 31 15 3-29-90 SAEF-2, 4 LIFTS,
 31 16 3-29-90 SAEF-2, 4 LIFTS,
 31 17 3-29-90 SAEF-2, 4 LIFTS,
 31 18 3-29-90 SAEF-2, 4 LIFTS,
 31 19 3-29-90 SAEF-2, 4 LIFTS,
 31 20 3-29-90 SAEF-2, 4 LIFTS,

32 1 4-14-90 LDEF, 1 LIFT, UNDER CLAMP C-11.8
 32 2 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP C-11.8
 32 3 4-14-90 LDEF, 1 LIFT, UNDER CLAMP B-11.4
 32 4 4-14-90 LDEF, 1 LIFT, UNDER CLAMP H-12.10
 32 5 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP H-12.10
 32 6 4-14-90 LDEF, 1 LIFT, CLAMP F-11, CORNER GRAB SAMPLE
 32C 7 4-14-90 LDEF, 1 LIFT, INSIDE LONG. 11-12, ROW F
 32 8 4-14-90 LDEF, 1 LIFT, UNDER CLAMP B-04.4
 32 9 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP B-04.4

32 10 4-14-90 LDEF, 1 LIFT, UNDER CLAMP E-04.4
32 11 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP E-04.4
32C 12 4-14-90 LIFT FROM BLACK TAPE ON CRANE UMBRELLA
32C 13 4-14-90 LIFT FROM WHITE PART OF CRANE UMBRELLA
32 14 4-14-90 LDEF, 1 LIFT, UNDER CLAMP D-12.4
32 15 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP D-12.4
32 16 4-14-90 LDEF, 1 LIFT, UNDER CLAMP E-12.4
32C 17 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP E-12.4
32C 18 4-14-90 LDEF, 1 LIFT, UNDER CLAMP B-01.4
32C 19 4-14-90 LDEF, 1 LIFT, NEXT TO CLAMP B-01.4
32C 20 4-14-90 LDEF, 4 LIFT, NEXT TO CLAMP B-01.4

33 1 4-13-90 LDEF, 1 LIFT, UNDER CLAMP B-08.4
33 2 4-13-90 LDEF, 1 LIFT, NEXT TO CLAMP B-08.4
33C 3 4-13-90 LDEF, 4 LIFT, UNDER CLAMP B-08.4
33C 4 4-13-90 LDEF, 4 LIFT, NEXT TO CLAMP B-08.4
33 5 4-13-90 LDEF, 1 LIFT, UNDER CLAMP H-07.5, WASHER AND BOLT HOLE
33 6 4-13-90 LDEF, 1 LIFT, UNDER CLAMP A-08.4
33 7 4-13-90 LDEF, 1 LIFT, NEXT TO CLAMP A-08.4
33 8 4-13-90 LDEF, 1 LIFT, UNDER CLAMP A-08.6
33 9 4-13-90 LDEF, 4 LIFT, NEXT TO CLAMP A-08.6, 2 IMPACTS
33 10 4-13-90 LDEF, 1 LIFT, UNDER CLAMP F-08.4
33 11 4-13-90 LDEF, 1 LIFT, NEXT TO CLAMP F-08.4, 1 IMPACT
33C 12 4-13-90 LDEF, 4 LIFT, NEXT TO CLAMP B-09.6
33 13 4-13-90 LDEF, 1 LIFT, UNDER CLAMP D-09.4
33 14 4-13-90 LDEF, 1 LIFT, NEXT TO CLAMP D-09.4
33C 15 4-13-90 LDEF, 1 LIFT, UNDER CLAMP F-02.8
33 16 4-13-90 LDEF, 1 LIFT, NEXT TO CLAMP F-02.8
33 17 4-13-90 LDEF, 1 LIFT, UNDER CLAMP F-02.4
33 18 4-13-90 LDEF, 1 LIFT, NEXT TO CLAMP F-02.4
33 19 4-13-90 LDEF, 1 LIFT, UNDER CLAMP E-02.4

34

35 1 SAEF-2, BLACK SOLE OF CLEAN ROOM BOOT
35 2 SAEF-2, FLOOR SAMPLE AFTER CLEANING
35 3 SAEF-2, SOLE OF BOOT AFTER ALCOHOL WIPEDOWN
35 4 BROKEN
35 5 LDEF, 1 LIFT, TRAY H-01 FRONT CENTER OFF GODDARD GRN
35 6 LDEF, 1 LIFT, DISCOLORATION OF H-01 TCC, H-01/H-12 EDGE
35 7 LDEF, 1 LIFT, DISCOLORATION OF H-01 TCC, H-01/H-12 EDGE
35 8 LDEF, 1 LIFT, H-01 TCC NOT DISCOLORED
35 9 LDEF, 1 LIFT, RESIDUE INSIDE LONG. 1-12, ROW A
35 10 LDEF, 1 LIFT, RESIDUE INSIDE LONG. 1-12, ROW A
35 11 LDEF, 1 LIFT, UPPER LEFT INTERCOSTAL, F-03
35 12 LDEF, 1 LIFT, UPPER RIGHT INTERCOSTAL, F-03
35 13 LDEF, 1 LIFT, BLACK RESIDUE UNDER FASTENER, H-05
35 14 LDEF, 1 LIFT, EARTH END OF LONG. 4-5
35 15 LDEF, 1 LIFT, FRAME EDGE OF G-06
35 16 LDEF, 1 LIFT, SPACE END OF LONG. 7-8
35 17 LDEF, 1 LIFT, EARTH END STRUT COL.7, ROW A/B
35 18 SAEF-2, 4 LIFTS, MSIG BENCH NEAR INTAKE VENTS
35 19 SAEF-2, 4 LIFTS, FLOOR NEAR MSIG BENCH
35 20 SAEF-2, 4 LIFTS, FLOOR NEAR AIRLOCK

36 NOT USED

37 NOT USED

38 10
38 11
38 12
38 13
38 14